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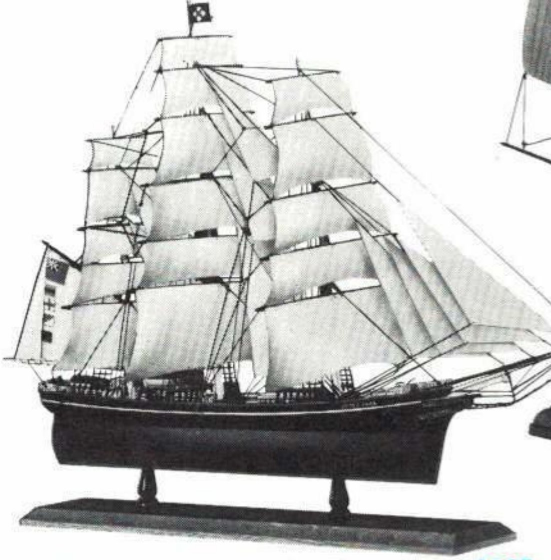

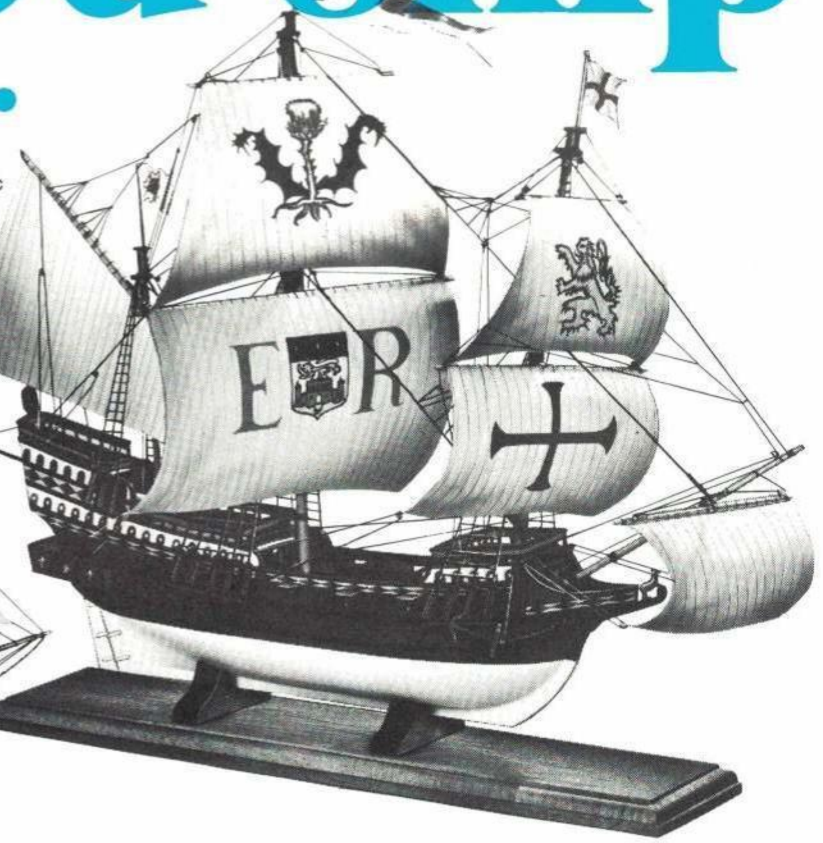

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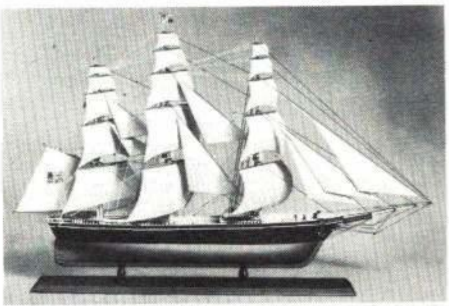

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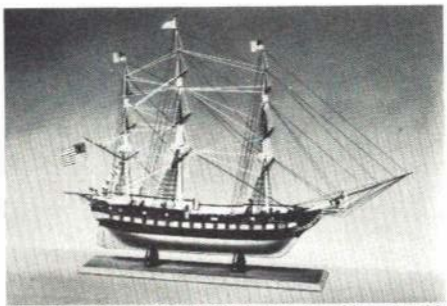

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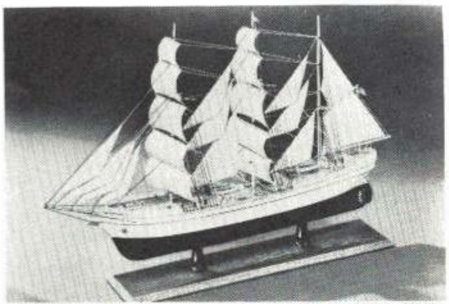

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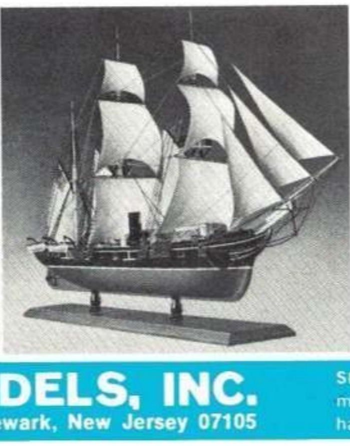

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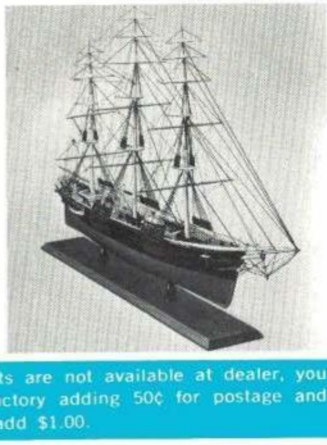

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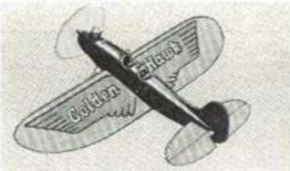
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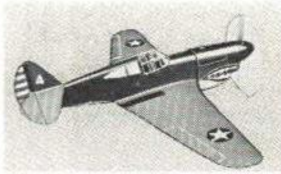
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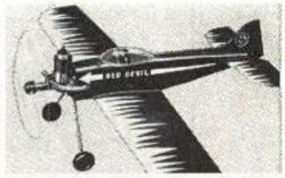
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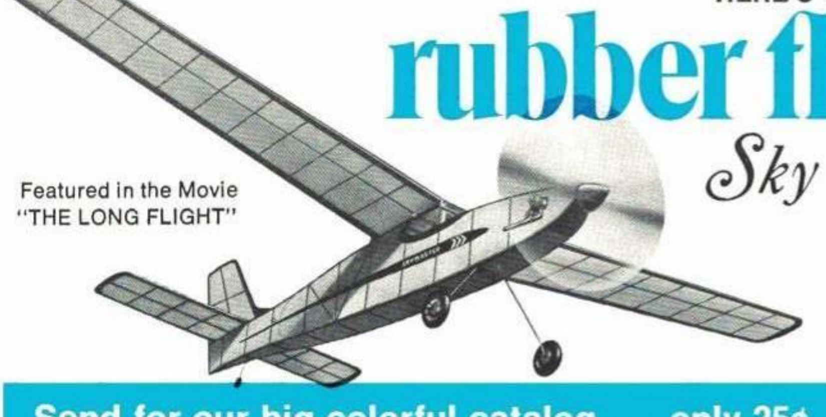

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COVER PHOTO: This Winnie Mae is a masterpiece in perfect scale. Untold hours of research went into Vega and Winnie Mae stories by Patricia and Monty Groves, this issue. RC model uses S.T. 70, 18/4 prop. Monty Groves' photo.

WILLIAM J. WINTER — PUBLISHER
Kathryn Conover, Editorial Assistant

EDWARD C. SWEENEY, JR. — EDITOR
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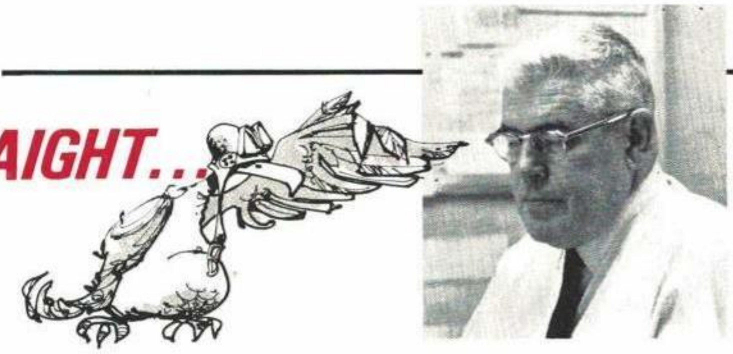
Editorial

STRAIGHT... ...AND LEVEL



Stearman leads the way; modelers can join movement to preserve aviation's living history.

THERE is a letter here this morning which will interest you greatly. It's from Bernie Kreitzer, president of Stearman Aircraft Industries. It invites everyone who has ever been involved with a Stearman to join a Stearman Alumnus Club, free of charge ($1 to cover cost of enrollment as a lifetime member). This may be done by sending to Mr. Lloyd Stearman, Honorary Chairman of the Board, Stearman Aircraft Industries, Inc., 5th Floor, 1133 Fifteenth St. N. W., Washington, D. C. 20005, a letter including name, address, the approximate date you first became involved with a Stearman, and model designation.

Among our readers some hundreds, or perhaps thousands, have had contact with real-life Stearmans, mostly through the famous PT-17 of WW-II primary training fame. Mr. Kreitzer makes no reference to model builders, but a line in the accompanying release reads: "All those who, by virtue of a longstanding affection for Stearman products, qualify to join the Stearman Alumnus Club, are invited to join our membership." That's enough for us. Those of us who built Stearman models are many indeed. Hardly a day goes by when someone does not ask for detailed plans or color schemes from some back issue, and there are grand kits still available, notably Sterling's magnificent radio-controlled version.

It may come as a shock to Stearman to find out how two generations of the air-minded youth of America have honored and enjoyed a "Stearman."

Lloyd Stearman is one of the great pioneers who contributed heavily to our aviation heritage. The PT series is part of the Stearman legend. He figured in the Lockheed 10 Electra, the Travel Air (some older models of which, with oddly balanced ailerons, became known as "Wichita Fokkers" because of their dubbing for D-7's in many war movies), and before that the Swallow — which takes more ancient readers back to their boyhood. In the days of the Swallow, Travel Air's, et al., Wichita was considered the aviation capitol of America. Many greats were associated in various companies who manufactured aircraft on the Kansas prairie. Clyde Cessna, Walter Beech, Stearman, and many others may be found listed as various company officers in 40- to 50-year-old copies of Jane's *All the World's Aircraft*.

It has been the good fortune of many of us to have life spans overlapping so many people who created the age of flight. One of the Wrights lived to enjoy a cockpit ride in a Constellation. It was our own good luck to have met some of them, mostly through interviews, like . . . Doc Walden, spry until just a few years ago, who built the first successful American monoplane. Heinrich who did the same but with an American engine (he built it with his brother). Charles Healy Day who designed the Standards and began with Glenn L. Martin in the "first" barnstorming age (well before the post-WW-I barnstormers flew surplus Jennies and Hisso-Standards). Verville who designed the Pulitzer racers and who died only a year or so ago.

Now this is anything but a name-dropping exercise. What bugs us — and strikes a responsive chord in this Stearman club thing — is that so little has been done to preserve the first-hand aviation legend. For example, the late Gill Robb Wilson who was, into the 1960's, publisher of *Flying* magazine. *Flying* derived out of the old *Popular Aviation* and, during the early Fifties, there were those, in the New York publishing house which owned *Flying*, who maintained it only out of the elder Bill Ziff's memory, provided it did not lose money. It did not have long to live when Gill Robb came on the scene. His vision and faith saved it, and we suppose those who inherited and benefited from his mission are well aware of their good fortune.

For a short spell we handled production in one of those low-glass-partitioned offices, next to the great man's. Columbia University used to send down a guy with a tape recorder and Gill would talk by the hour, for he was a depository of the legends of a great many people with whom he had flown, back through WW-I days. It was hard indeed to concentrate while Wilson rambled on by the hour about the Graf Zeppelin, old-time aces, a frightening pre-war dinner in Germany where the likes of Goering made chilling pronouncements. There remain hundreds of people who should be on the record before slimming time runs out and we have to read second-hand and third-hand stories by pretenders of the gospel of the air world.

We suppose Stearman will read this message. Others, too, at the Smithsonian, publishers, authors, historians, those who can do something to accurately preserve this living history before it is too late. Anyway, if you've ever built a Stearman model, or build one, drop a line to Stearman and say how great it was. We'll cost them a fortune in replies and literature. But they should love it.

IN passing we'd like to pay tribute to a grand guy, Jay Cleveland, who recently retired as publisher of *Model Airplane News*, a post he had held for many years. Having been his editor for 10 years, we think *MAN* missed a bet in not telling us more about him when he bowed out. In 1929, when Jay was a military academy cadet in the south, the late Bernarr MacFadden (mostly remembered for physical culture and *True*

Continued on page 78

YOU said it!

Bless its little heart

Your Straight and Level comments on the GHQ engine brought back many fond memories. Twenty-four years ago I traded a friend a Thor, which I couldn't start, for a GHQ, which I couldn't start.

I cranked the thing for weeks, both clockwise and counter-clockwise and got nothing more than some pops. Then I sold it for a dollar to another friend who put a flywheel on it and put his bike wheel up against it and away he peddled. It ran . . . how else could it protest? He even tried to power his bike with it, but he didn't have much luck.

Finally, when glow plugs were introduced I bought it back for 50 cents and with a gravity fuel tank was able to run it. The best flight I ever got was with a skeletal machine looking like a rubber-powered ROG. I hand-launched it and it climbed to an altitude of 12 feet. Then it began a long and slow descent, finally crashing into some tomato plants.

The engine's end came on my 21st birthday. I'll never forget because it was the same day my favorite hunting dog died. Dad and I buried old Diablo behind the barn. An hour later I also buried my GHQ under a tomato plant.

Keith Gebers, Elk Grove, Calif.

Modeler's exchange

I have a claim to you. I'm an aero-modeler, 25 years old. I build according to the category Wakefield, and make free engine models according to FAI. In those categories, I reached good results at many contests in my country and in foreign countries. I'm receiving *Aeromodeler*, your magazine, *Modelarz* and so on.

I would like to correspond with modelers who are making free engine models or Wakefield. I would like eventually to exchange magazines and materials like engines, propellers, timers, designs, etc. I hope that with your help I will make friendship with modelers of your country.

Miroslav Sulc, Nová c. 30, Poprad IV
Czechoslovakia, Europa

A belcher remembered

Of course the GHQ ran! My older brother had one which we used to run in the cellar just about anytime we got bored. As I recall, it ran well and started easily using a flywheel and an "E-Z Starter" (a large washer with a slot cut in it to accept a starter cord, *a la* lawn motor).

My father and brother built a Mercury to take the Q, but Dad couldn't understand how anyone could let the product of many hours' labor fly away, so he installed the new-fangled U-control system.

After learning to fly on several profiles with an ignition O & R 60, my brother, his friends and I went to the field with the Mercury.

The Q was so built that it wouldn't run on a wooden prop, so they cranked it up with an 11" or 12" aluminum right-hand prop. The timer and needle valve were advanced, the engine roared, my brother took the handle and I let go (that's why they allowed me to come — to sit in the exhaust holding the tail).

The plane just sat there, quivering. At full bore, the wheels wouldn't even roll!

That was the last attempted flight of our U-control Mercury. It laid around the house for a few years, gradually getting broken up. We built some ½A control lines for awhile, then stopped modeling through college.

Now I'm trying to bring home just one RC plane intact from a flying session. But I'll always remember the sound of that GHQ, belching its oily exhaust into the cellar.

Richard Freda M.D., Indiana, Pa.

Royal ramifications

Just wanted you to know that I completed an eight-foot Royal Marine twin-engine seaplane, as designed by Yuji Oki in your May issue. However, I did put two modifications in my version: one insignificant, the other major.

First, I put in a cockpit, to give the ship the look of a Catalina flying boat of World War II vintage. Most important, for two 40 glow engines I substituted two ancient Olsen & Rice 60's, converted to glow operation. I couldn't be more happy about the operation.

In flight, the "chug-a-chug-chug" sound of the old engines spinning their 14-6 props at 7,000 rpm is just fantastically realistic and impressive. One of the engines had been in mothballs in my toolbox since I cracked up my Tabi-designed Pacer C twenty years ago; the other was a fantastic acquisition through one of America's Hobby Center's "junk engine specials." It's a shame that some of the fliers today don't realize how great some of these old warhorse engines are in modern RC flying. I've never had so much fun with a ship as I have with this one, nor have I drawn so large a crowd when she takes off!

Manny Weingarten, Brooklyn, N. Y.

100 miles to nowhere

I just read the May issue of AAM and after seeing your editorial on the GHQ, I just had to sit down and write. Boy, do I remember the GHQ! Back in prehistoric 1946, I had been building models for several years, but only rubber-power. There just weren't any engines to be had.

After several hundred Easybuilt and Model Craft kits, the time had come to graduate. I bought a kit for a 42" Thunderbird.

After considerable looking, I found a young fellow who was willing (now I look back, maybe "anxious" is a better word) to let his Q go for five bucks. He was known locally as Ole Lumpy Fingers. Included with the Q was an aluminum 11" prop which was guaranteed to start the darn thing.

We mixed up a can of fuel, hooked up the coil and condenser on a bench and started flipping. If the total number of revolutions we put on it one at a time were added up, I'll bet we flipped that workbench at least 100 miles, and must have put ten gallons of fuel mix through it without ever getting any more than six straight revs out of her.

All we ever accomplished was to fill our juvenile lungs with enough blue smoke to make us immune to all the cigarettes we have smoked since. As I look at my fingers, after nearly 25 years I can still make out the scars and lumps from that aluminum prop. I finally wrecked the Thunderbird gliding it out the barn door, but don't really know what happened to the Q. It may still be around someplace, or may have been used as a weight out on the bay — in which case, I hope it rests in peace.

I graduated from the Q to a Rogers KD29, which was just about as good. The only difference was a smaller prop, so the lumps

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YOU said it!

Continued from page 6

weren't as noticeable.

Our main ambition was to own a Morton M-5. I've often wondered if any of them are still around. It always seemed reasonable that if one cylinder fired each time around, the other four had to get into the act at least once in a while and that might keep it going.

Incidentally, I still have the old Rogers, as well as a Drone Diesel which I never got running either, come to think of it. . . .

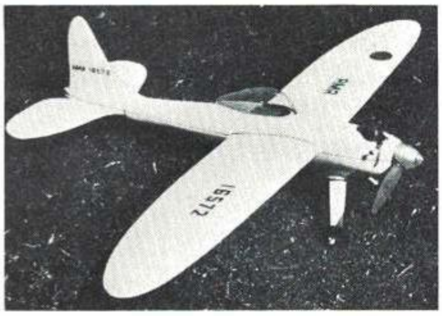
Jay Johnson, St. Williams, Ontario

Judging by the mail every man, woman and child in America once had a GHQ. The five-cylinder Morton did run, and a few collectors still have live samples. The Drone Diesel was a sturdy engine, and won the CL stunt event at the 1947 Nats. It had no variable-compression lever — which required a little understanding. — Publisher.

Fireball flies again

So much has been written about the late Jim Walker recently that I thought you might like to know at least one of his Fireballs is still flying. This model was built from a kit years ago by another fellow and was rebuilt by me in 1968.

This is the first Fireball for me. Back in the old days some of my friends had Fireballs but I flew a Super V Shark to be different. As far as I am concerned, the Fireball and the Stanzel models are among the most beautiful UC models ever designed.



This model has a Cameron 19 and some lead in the nose. Recently, a friend, Gene Wright, flew it and said, "It sure takes me back." Gene was one of the first in the area to fly a Fireball way back when.

Bill Thompson, San Diego, Calif.

'Q' tips

I read with great interest your editorial on the GHQ engine, for I have just finished getting one to run. I thought it was enough of a coincidence to write and tell you of my (or GHQ's) success.

About two months ago, in quest of ignition engines for my small collection, I bought a Q missing only the original needle valve. Remembering how I and other kids had labored to try and get one to run, I decided I would try to make this one run, even if it meant altering the engine.

After close examination, I decided this engine was one of the kit engines sold just prior to WW II for $4.95. It was the crudest job I have ever seen. The cast iron cylinder walls were left with cutter marks and all port holes were drilled and left as is.

Although the piston was pressed or stamped, it was round within a half-thousandth and it was the best piece in the engine. The bronze connecting rod was left as cast with flash or burrs, and the bottom

Charlie just won the big one at Indianapolis.

That makes three weekends in a row for Charlie. At this rate, it won't be long until he'll be taking on the terror of Elm Street, "Flash" Ferguson.

Asked in the Winner's Circle about the secret of his coveted driving style, Charlie—with the roar of the .19 cu. in. engines still in his ears and the feel of the road still in his hands—just smiled, lifted his goggles, and said it all in one word.

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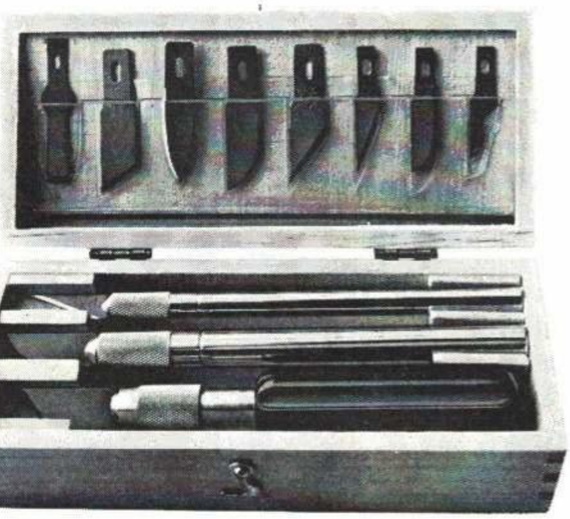

hole to fit the crankshaft was egg-shaped to the point that it slopped around on the crankshaft. The crankshaft was not hardened but left in its soft state. The gaskets were thick and crude; I'm not sure if they were the originals. The rest of the parts seemed OK. My task began.

I honed the cylinder wall until it was smooth, retapped all holes with a No. 5-40 tap, and ground the top and bottom of the cylinder flat and parallel (which also increased compression). Since I had increased the cylinder diameter by .0035 by honing, I had it nickel-plated to bring it back to size. The plating was hardened to approximately 65 Rockwell C. With a little lapping, I had the piston fitting very well. Since I had cleaned up the whole casting with a hand shaft and mounted points, the plated cylinder looked good.

I reamed the egg-shaped hole in the connecting rod to $^{9}/_{32}$ diameter and replaced the stud on the crankshaft with a hardened stud to fit. The whole crankshaft was nitrided to give a good hard-wearing skin. Remaking all the gaskets from Perfect's gasket stock, I assembled the engine. After testing compression, I found no matter how tight the V-1 Champion plug was, it leaked compression under the plug gasket. Removing the head, I found the seat was uneven. By milling it flat, it eliminated the leak.

Removing the needle valve seat, I plugged the tapped hole with a setscrew and some Permatex. Drilling through the intake tube 90 degrees to the old valve, I installed an Austin universal valve. I hooked up a tank and the darn engine ran on glow fuel and a VG-1 very nicely. With the 13" prop, it was slow but steady.

The timer assembly required little work, just setting the gap for the points and new insulation around the stationary point. With a 3-to-1 unleaded gas and SAE 70 oil mixture, an Aerospark coil, an unknown-make condenser and two 1½ volt bell batteries, I was set for the test. Having no instruction sheet, I set the points to fire what appeared to be just when the piston came over the top.

After priming, she fired a big blue sheet of flame out the four little exhaust holes. Figuring she fired at the bottom of the stroke, I moved the points around almost 90 degrees. A few flips and she fired, a few more and off she went.

By today's standards she runs slow, but she runs. The spark advance brings the rpm's up, but not greatly. I have opened the diameter of the intake tube and cut the opening at a 45-degree angle (intake is on the side of the engine, thus the angled opening is somewhat like a front rotary intake and catches forced air from the prop). I opened the exhaust ports about 30% and, although all of this has increased the rpm, I'm afraid it will never sing.

I have 1½ hours running time and no signs of wear or trouble. At this time, I am mounting it in an old control line job to prove a Q will not only run, but fly.

Bud Presti, Nashua, N. H.

Appeal for support

I have been building for four years. My father started me building but he hasn't been able to see the fruits of his labor.

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Bob Fuller, Jacksonville, Fla.

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7	3-4-6	.40	1.00
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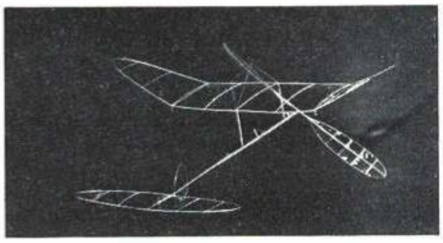


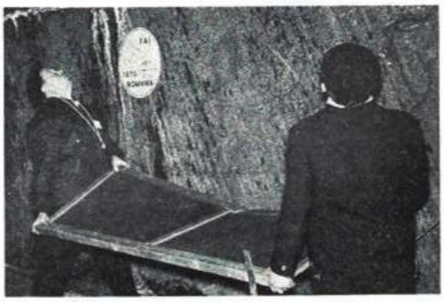
Model of sixth-placer Clarence Mather, USA, circles upward. Top flight over 28 min.

IT was a rough contest! Mr. Ion Bobocel and the Modeling Federation of Romania did an outstanding job of organization and planning. Model flying in Europe has the same status as any other competitive sport, rather than being considered a hobby activity. All contestants and guests were treated to the best Romania had to offer.

The salt mine at Slanic is breathtaking to behold and until now had the conditions that indoor fliers dream of — tremendous ceiling and no drift. But, when one hundred or more people, strings of powerful lights, and portable heaters are put in a room full of cold air, the conditions become terrible.

Vilim Kmoch of Yugoslavia, winner of

Continued on page 66



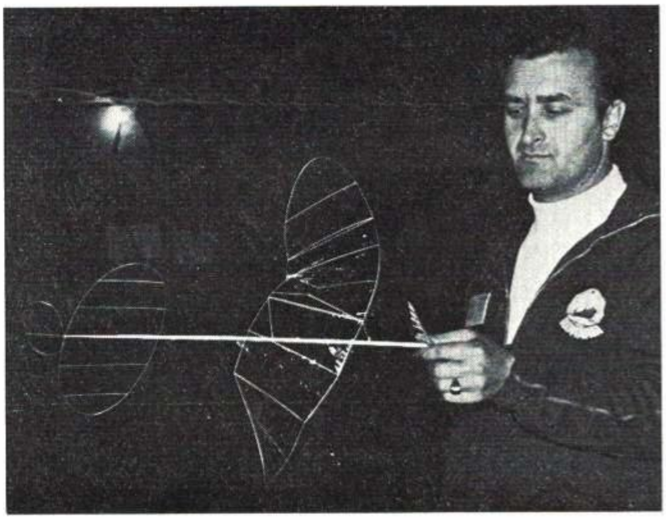
Even salt mines have their hang-ups. Here door-waving is used to dislodge a model.

World champion, Jiri Kalina of Czechoslovakia, launches. Times over 37 and 36 min.

It is cold in those mines. CD Ivan Dumitru carefully measures and weighs each model.

Pete Andrews rebuilt his model for rough conditions and placed 12th for USA team.

Second place won by Jim Richmond of USA. His best times were just over 32 min. each.



Cold temperatures, heaters, and indoor models don't get along well together. Heaters caused very rough air, broke many models.

Former World Champion, Hans Beck, placed 24th. He hooks rubber to his model, while helper provides light by small flashlight.

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Radio Control Flying is Fun! You can actually feel the thrill of controlling an airplane in flight — doing stunts, loops and rolls — and making it come back to you and land where you want. And the shortest way to success is with the unique new RANGER 42. This model has been carefully engineered, leaving only the simplest final assembly steps, all clearly illustrated. Flight stability is exceptional, as well as response to control. **All you have to do is add your engine, wheels, and radio control — only 6 to 8 hours work — and you're ready to go FLYING!** Just ask your hobby dealer — he'll be glad to show you the features.

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DELUXE — Includes New Fittings

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Span 42″ Area 244 sq. in.
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For .049 Engines

Tough, roomy cabin and front end, takes single to 10 channels or proportional.
Steerable nose gear.
SPAN 62″ AREA 540 sq. In.
LENGTH 50″ WEIGHT 4½-5 lbs.
FOR ENGINES FROM .19 to .35

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Sr. Falcon Shown

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DELUXE — Includes New Fittings.
Takes Single to 10 Channels or Proportional
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Span 56″ Area 558 sq. in.
Length 43″ Weight 3½ lbs.
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Vega

The name of Lockheed's first aircraft meant speed, distance, and reliability. Its legendary pilots and historic accomplishments made it one of aviation's greatest achievements.

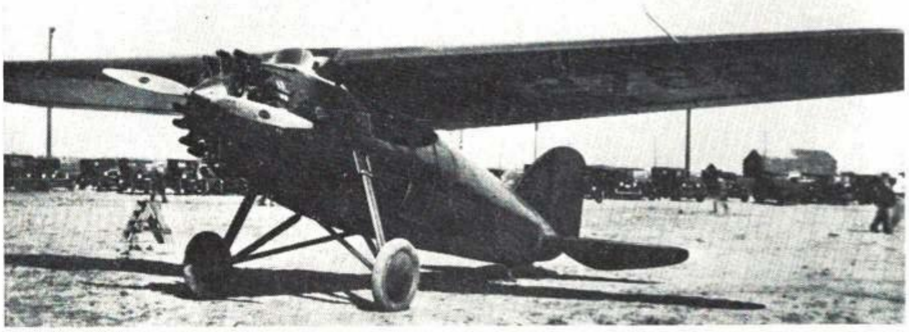
PATRICIA GROVES

IN May of 1927, when Lindbergh completed his daring solo flight to Paris, the first Lockheed Vega was a scant few weeks from its maiden flight. Unique in design and construction, the Vega would make history. Within months of pilot Eddie Belande's test flight, July 4, 1927, the sleek high-winged monoplane was earning fame for herself and for the men and women who flew her.

A minimum number of struts and exposed control wires made the Vega extremely fast and efficient for its horsepower, when compared with popular designs and construction methods. The wing, based on the flat-bottomed, high-rounded Clark Y airfoil, adapted to Fokker's cantilevered design, became one of Vega's distinctive features. Consisting of $^{3}/_{32}$" spruce plywood veneer planking glued and tacked over a framework of spars and ribs, the internally braced wing was built for speed and endurance. Sixteen $^{5}/_{16}$" diameter steel bolts, grouped in a series of four and tied down in four places to the two main spars over the CG, supported the weight of the airplane. This distinctive cantilevered wing, joined with the equally distinctive fuselage, produced a streamlined beauty — free of most of the usual parasite drag.

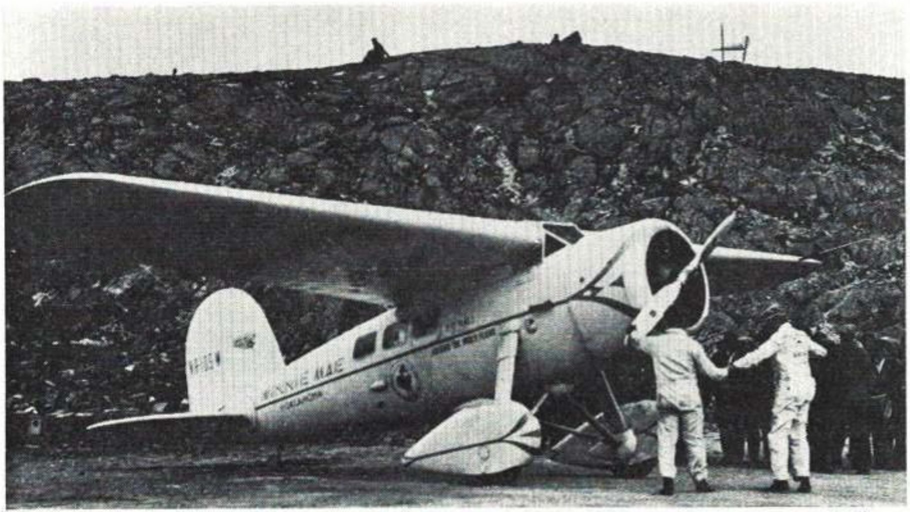
The cigar-shaped fuselage consisted of two molded plywood shells fitted over a skeleton framework of 14 concentric elliptical hoops held together with four longerons.

Continued on page 72



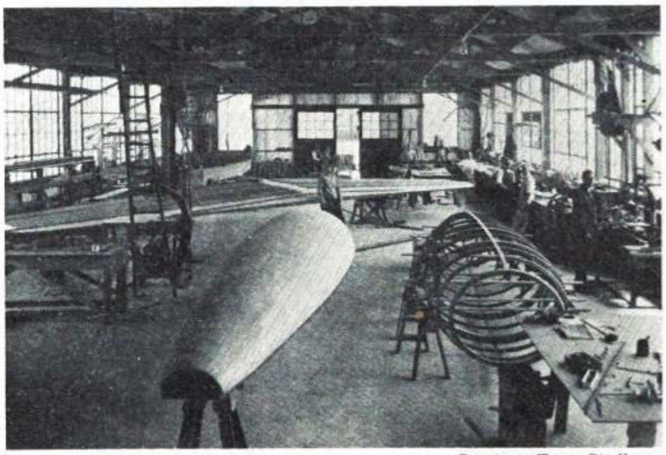
Courtesy, Lockheed Aircraft Corp.

Vega No. 1 about to fly on her own at Inglewood, Calif., July 4, 1927. Those days there was a feeling pilot should be "outdoors," hence open cockpit forward of the wing.



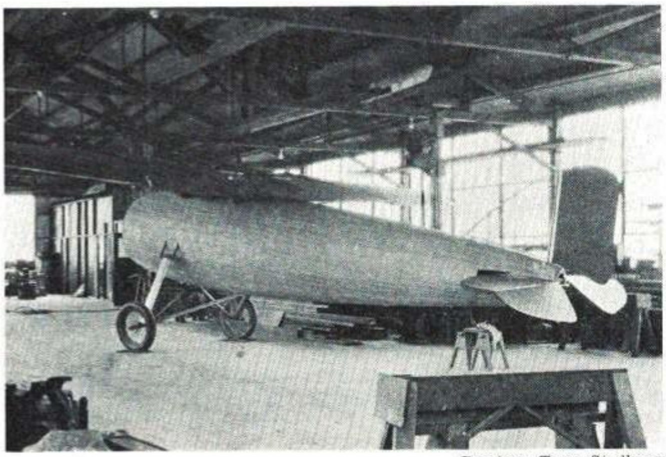
Courtesy, Tony Stadlman

By 1931, enclosed cockpit, full cowl, pants and bigger engine were conspicuous changes. In pic, Post and Gatty get set to leave Newfoundland on second leg of round-world trip.



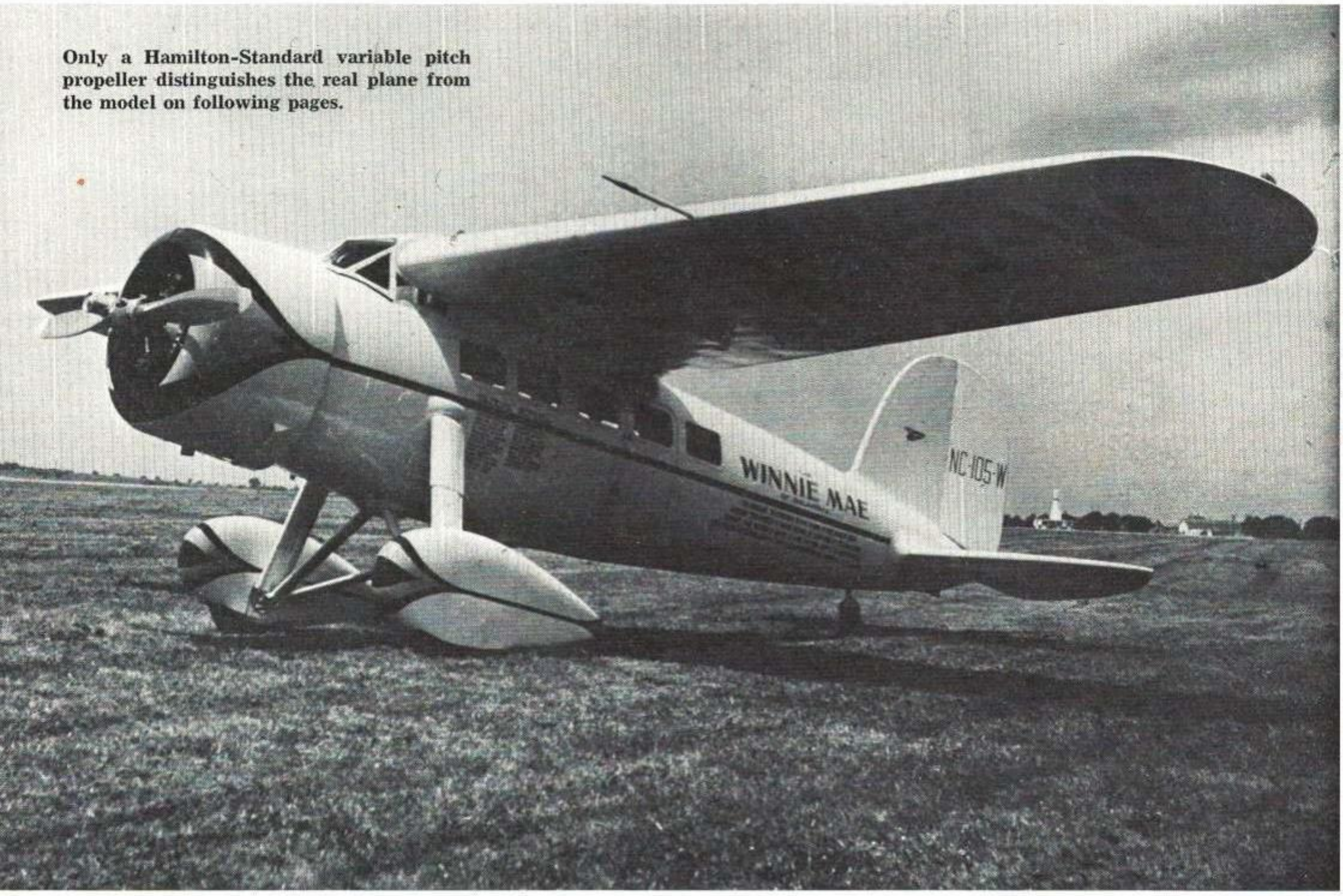
Courtesy Tony Stadlman

Total assets of Lockheed in 1927 — plant, personnel and aircraft. Upper left, mold is under pressure as wing is prepared for load test. In foreground finished skeleton and a shell await mate.

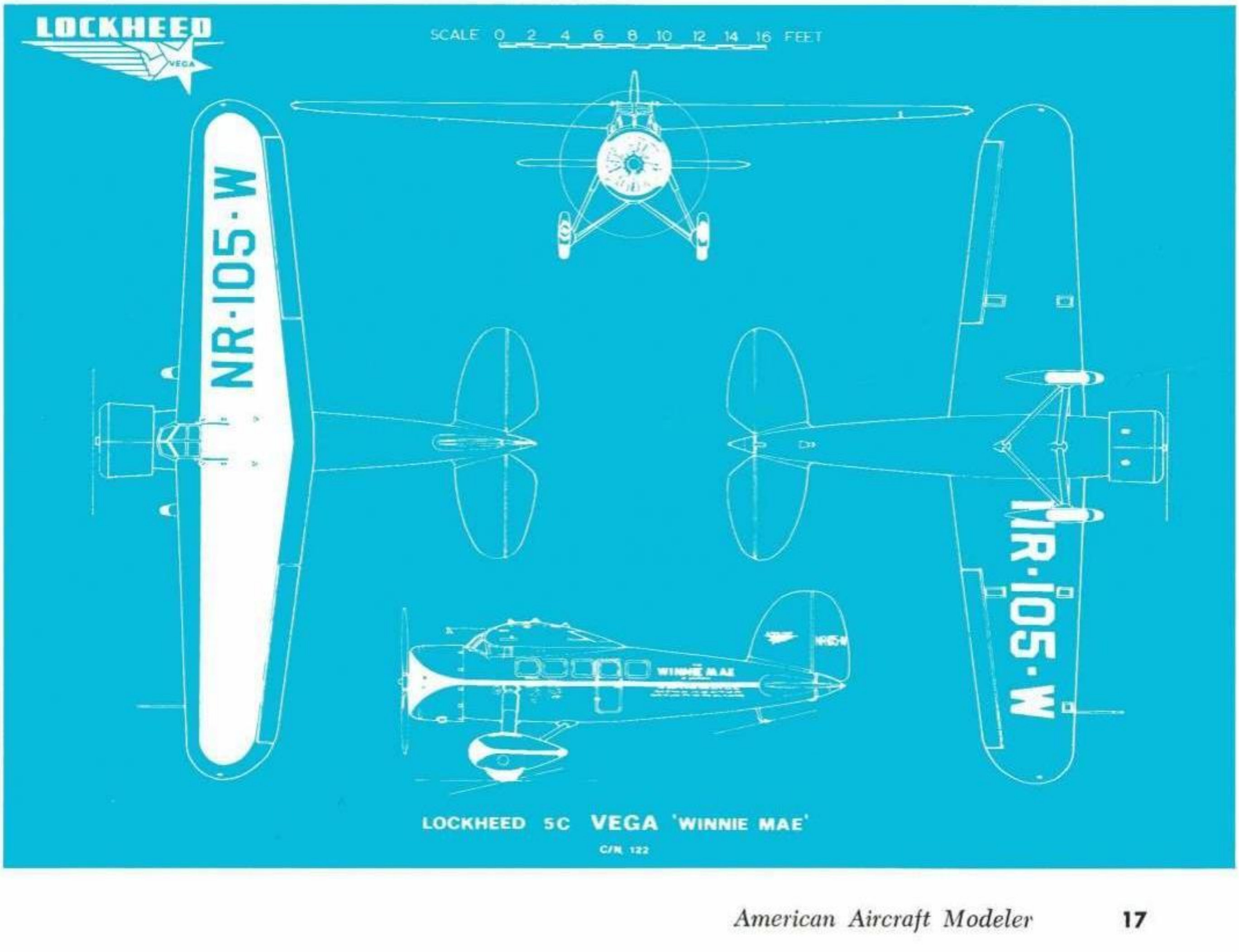


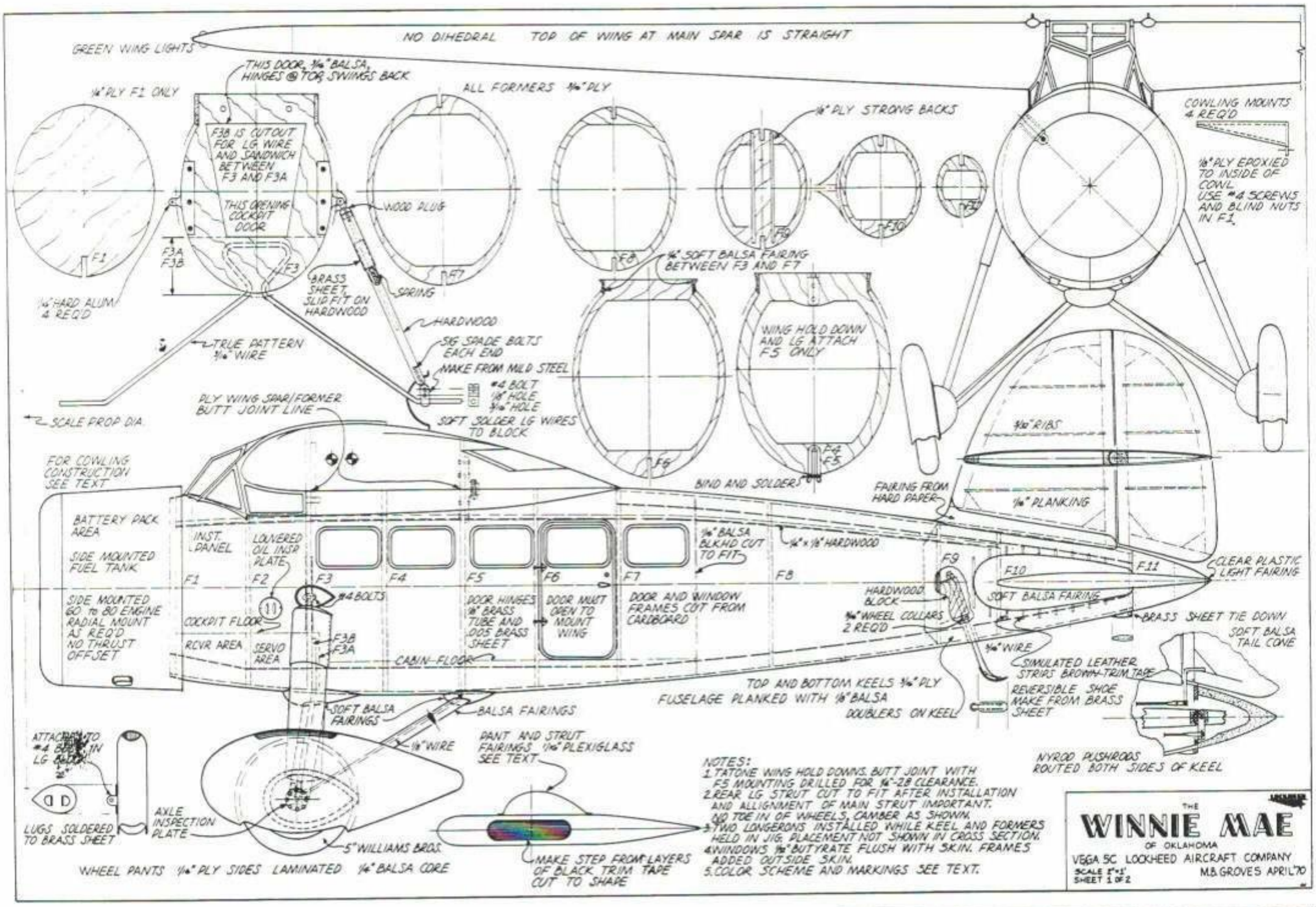
Courtesy Tony Stadlman

Golden Eagle fuselage and wing come together for the first time to make a Vega. Windows and doors were cut out later. Partially completed tail group shows the early "A" tail configuration.



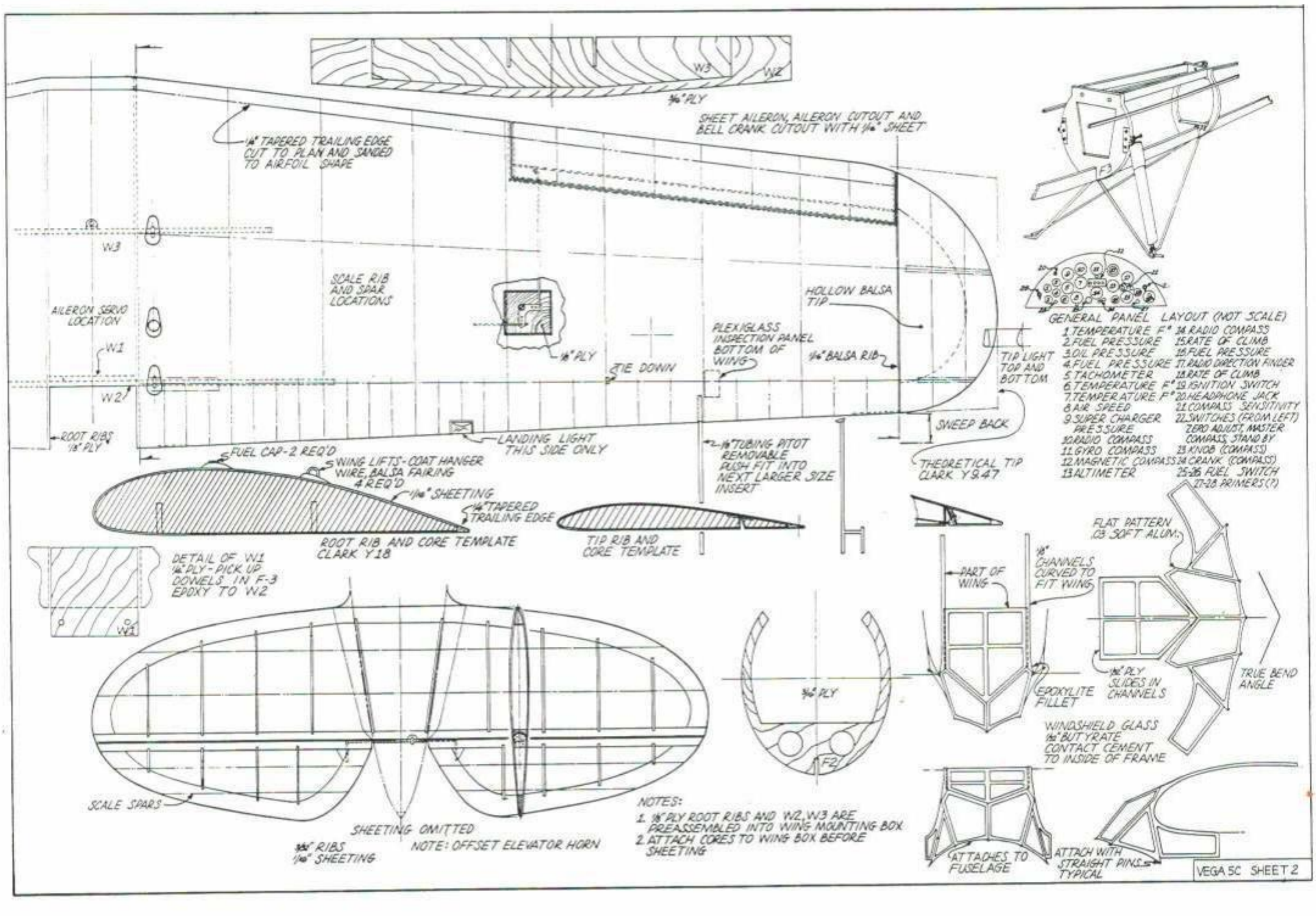
Only a Hamilton-Standard variable pitch propeller distinguishes the real plane from the model on following pages.


LOCKHEED
VEGA
SCALE 0 2 4 6 8 10 12 14 16 FEET
NR-105-W
WINNIE MAE
NR-105-W
NR-105-W
LOCKHEED 5C VEGA 'WINNIE MAE'
C/N 122


NO DIHEDRAL   TOP OF WING AT MAIN SPAR IS STRAIGHT
GREEN WING LIGHTS
THIS DOOR, 3/16" BALSA, HINGES @ TOP, SWINGS BACK
1/8" PLY F1 ONLY
ALL FORMERS 3/32" PLY
1/8" PLY STRONG BACKS
COWLING MOUNTS 4 REQ'D
1/8" PLY EPOXIED TO INSIDE OF COWL USE #4 SCREWS AND BLIND NUTS IN F1
F3B IS CUTOUT FOR LG WIRE AND SANDWICH BETWEEN F3 AND F3A
THIS OPENING COCKPIT DOOR
WOOD PLUG
F1
F3A
F3B
F3
F7
F8
F9
F10
F11
1/16" HARD ALUM. 4 REQ'D
BRASS SHEET SLIP FIT ON HARDWOOD
SPRING
HARDWOOD
TRUE PATTERN 3/16" WIRE
SIG SPADE BOLTS EACH END
MAKE FROM MILD STEEL
#4 BOLT 1/8" HOLE 3/32" HOLE
SOFT SOLDER LG WIRES TO BLOCK
1/4" SOFT BALSA FAIRING BETWEEN F3 AND F7
WING HOLD DOWN AND LG ATTACH F5 ONLY
F6
F4
F5
BIND AND SOLDER
SCALE PROP DIA.
PLY WING SPAR/FORMER BUTT JOINT LINE
3/32" RIBS
FOR COWLING CONSTRUCTION SEE TEXT
BATTERY PACK AREA
SIDE MOUNTED FUEL TANK
SIDE MOUNTED 60 TO 80 ENGINE RADIAL MOUNT AS REQ'D NO THRUST OFFSET
INST. PANEL
LOUVERED OIL INSP PLATE
COCKPIT FLOOR
RCVR AREA
SERVO AREA
F2
#4 BOLTS
DOOR HINGES 1/8" BRASS TUBE AND .005 BRASS SHEET
DOOR MUST OPEN TO MOUNT WING
DOOR AND WINDOW FRAMES CUT FROM CARDBOARD
1/4" BALSA BLKHD CUT TO FIT
1/4" x 1/8" HARDWOOD
FAIRING FROM HARD PAPER
1/16" PLANKING
CLEAR PLASTIC LIGHT FAIRING
HARDWOOD BLOCK
3/32" WHEEL COLLARS 2 REQ'D
SOFT BALSA FAIRING
BRASS SHEET TIE DOWN
SOFT BALSA TAIL CONE
CABIN FLOOR
1/16" WIRE
SIMULATED LEATHER STRIPS BROWN TRIM TAPE
TOP AND BOTTOM KEELS 3/32" PLY
FUSELAGE PLANKED WITH 1/8" BALSA
DOUBLERS ON KEEL
REVERSIBLE SHOE MAKE FROM BRASS SHEET
NYROD PUSHRODS ROUTED BOTH SIDES OF KEEL
SOFT BALSA FAIRINGS
BALSA FAIRINGS
1/8" WIRE
PANT AND STRUT FAIRINGS 1/16" PLEXIGLASS SEE TEXT
ATTACHED TO #4 BOLT IN LG BLOCK
LUGS SOLDERED TO BRASS SHEET
AXLE INSPECTION PLATE
5" WILLIAMS BROS.
MAKE STEP FROM LAYERS OF BLACK TRIM TAPE CUT TO SHAPE
WHEEL PANTS 1/16" PLY SIDES LAMINATED 1/4" BALSA CORE
NOTES:
1. TATONE WING HOLD DOWNS. BUTT JOINT WITH F5 MOUNTING DRILLED FOR 1/4"-28 CLEARANCE.
2. REAR LG STRUT CUT TO FIT AFTER INSTALLATION AND ALLIGNMENT OF MAIN STRUT IMPORTANT. NO TOE IN OF WHEELS, CAMBER AS SHOWN.
3. TWO LONGERONS INSTALLED WHILE KEEL AND FORMERS HELD IN JIG. PLACEMENT NOT SHOWN IN CROSS SECTION.
4. WINDOWS 1/32" BUTYRATE FLUSH WITH SKIN. FRAMES ADDED OUTSIDE SKIN.
5. COLOR SCHEME AND MARKINGS SEE TEXT.
THE
WINNIE MAE
OF OKLAHOMA
VEGA 5C LOCKHEED AIRCRAFT COMPANY
SCALE 2"=1'
SHEET 1 OF 2
M.B. GROVES APRIL '70

Plan available in either 2" = 1' as shown or 1½" = 1'. Smaller version more suitable for sport/scale flying.

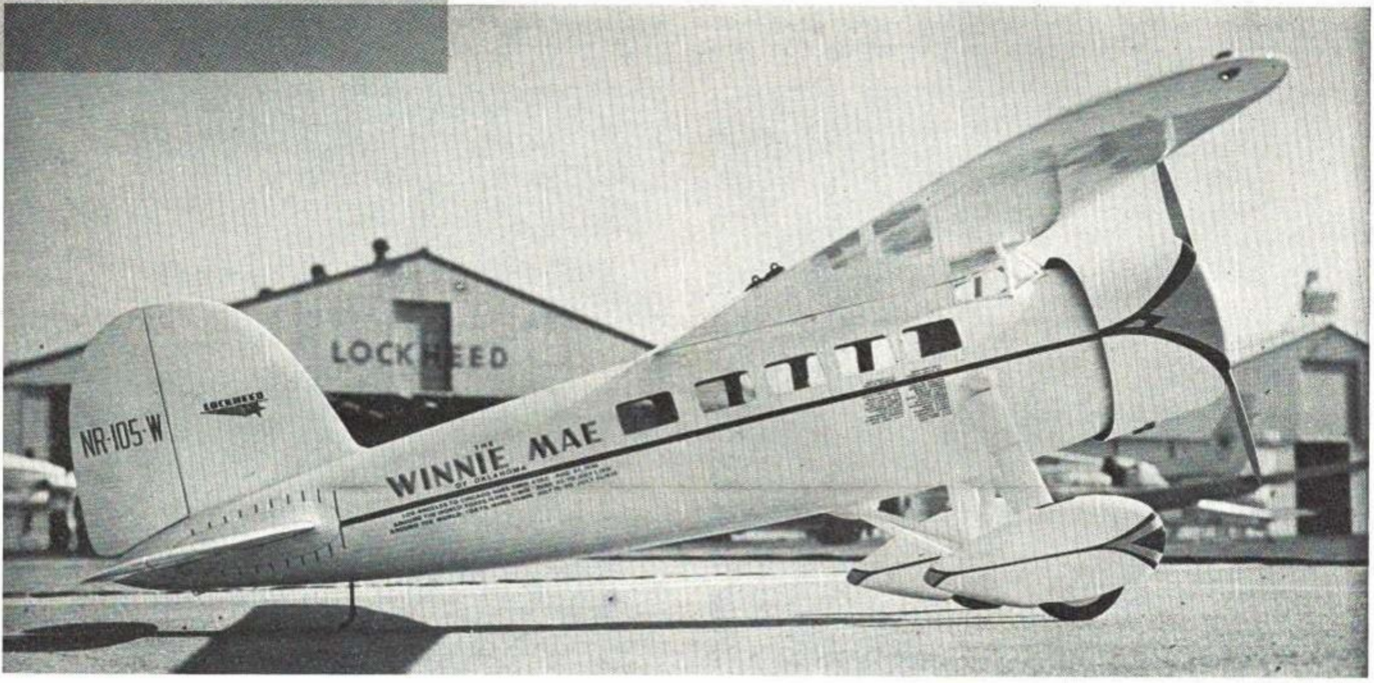
FULL SIZE PLANS AVAILABLE — SEE PAGE 70


W3
W2
3/32" PLY
1/4" TAPERED TRAILING EDGE CUT TO PLAN AND SANDED TO AIRFOIL SHAPE
SHEET AILERON, AILERON CUTOUT AND BELL CRANK CUTOUT WITH 1/16" SHEET
W3
SCALE RIB AND SPAR LOCATIONS
AILERON SERVO LOCATION
W1
W2
1/8" PLY
TIE DOWN
HOLLOW BALSA TIP
PLEXIGLASS INSPECTION PANEL BOTTOM OF WING
1/16" BALSA RIB
TIP LIGHT TOP AND BOTTOM
SWEEP BACK
ROOT RIBS 1/8" PLY
LANDING LIGHT THIS SIDE ONLY
1/8" TUBING PITOT REMOVABLE PUSH FIT INTO NEXT LARGER SIZE INSERT
THEORETICAL TIP CLARK Y 9.47
FUEL CAP-2 REQ'D
WING LIFTS-COAT HANGER WIRE, BALSA FAIRING 4 REQ'D
1/16" SHEETING
1/4" TAPERED TRAILING EDGE
ROOT RIB AND CORE TEMPLATE CLARK Y18
TIP RIB AND CORE TEMPLATE
DETAIL OF W1 1/4" PLY-PICK UP DOWELS IN F-3 EPOXY TO W2
W1
GENERAL PANEL LAYOUT (NOT SCALE)
1. TEMPERATURE F°
2. FUEL PRESSURE
3. OIL PRESSURE
4. FUEL PRESSURE
5. TACHOMETER
6. TEMPERATURE F°
7. TEMPERATURE F°
8. AIR SPEED
9. SUPER CHARGER PRESSURE
10. RADIO COMPASS
11. GYRO COMPASS
12. MAGNETIC COMPASS
13. ALTIMETER
14. RADIO COMPASS
15. RATE OF CLIMB
16. FUEL PRESSURE
17. RADIO DIRECTION FINDER
18. RATE OF CLIMB
19. IGNITION SWITCH
20. HEADPHONE JACK
21. COMPASS SENSITIVITY
22. SWITCHES (FROM LEFT) ZERO ADJUST, MASTER COMPASS, STAND BY
23. KNOB (COMPASS)
24. CRANK (COMPASS)
25-26 FUEL SWITCH
27-28 PRIMERS (?)
FLAT PATTERN .03 SOFT ALUM.
1/8" CHANNELS CURVED TO FIT WING
PART OF WING
1/32" PLY SLIDES IN CHANNELS
TRUE BEND ANGLE
EPOKYLITE FILLET
3/32 PLY
F2
WINDSHIELD GLASS 1/32" BUTYRATE CONTACT CEMENT TO INSIDE OF FRAME
SCALE SPARS
SHEETING OMITTED
3/32" RIBS 1/16" SHEETING
NOTE: OFFSET ELEVATOR HORN
NOTES:
1. 1/8" PLY ROOT RIBS AND W2, W3 ARE PREASSEMBLED INTO WING MOUNTING BOX
2. ATTACH CORES TO WING BOX BEFORE SHEETING
ATTACHES TO FUSELAGE
ATTACH WITH STRAIGHT PINS TYPICAL
VEGA 5C SHEET 2

MODEL OF A GREAT VEGA

Winnie Mae

Text tells epic story of real plane which author has meticulously modeled for radio control. It is a realistic, smooth flyer with that three-inch thick lifting airfoil.



All photos by the author

There exists a real restored Vega which represents the Winnie Mae in a slightly different configuration from that seen in this model article. Model is true to scale in every shape and dimension. It flies with equal realism, requires coordinated aileron and rudder.

MONTY & PATRICIA GROVES

DURING the early Thirties, aviation stirred the American people with a frenzied enthusiasm never equalled since. The activities and names of pilots and aircraft were frequent headline news. Some of these names have endured; others quickly faded. But the most famous name of all came off an aircraft line as C/N-122. This prosaic Contractor's Number was assigned by Lockheed Aircraft Company to a Vega 5 B. Licensed NC-105-W and christened Winnie Mae, her distinctive paint scheme of gleaming white and two shades of blue soon gained world-wide recognition.

Purchased by millionaire Oklahoma oilman F. C. Hall and named for his daughter, Mrs. Winnie Mae Fain, this was the second Vega to carry the Winnie Mae name. The first, purchased in 1928, had been sold back to Lockheed. Her now unemployed pilot, Wiley Post, returned her to Burbank and there became a test pilot and general utilities man.

In June of 1930, Mr. Hall called his ex-personal pilot and wanted to repurchase the Winnie Mae. When told it had been renamed and resold, he promptly ordered a new Vega and rehired Wiley. Post put his working experience with Lockheed to good use. Hall had told him to get the best, and Post initiated changes and modifications on the new Winnie Mae. When they were completed, he resumed as Hall's personal pilot.

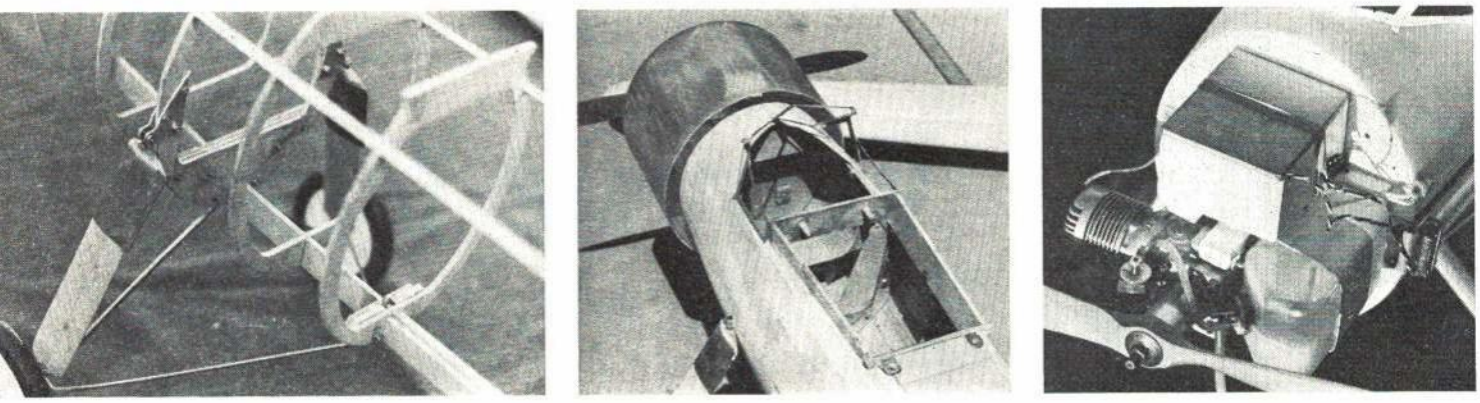
Post's old desire to make a record flight caused him to consider entering the 1930 National Air Races Los Angeles to Chicago non-stop derby for men. Mr. Hall agreed to enter the Winnie Mae. To put the ship in trim for maximum speeds, Lockheed set the wings at a lower angle of incidence, and a military-type supercharger (10:1 as opposed to 7:1 civilian) was installed on the P&W Wasp engine. To reduce the danger of nose over, four inches were taken off the tail skid. Additional tanks increased fuel capacity to over 500 gallons.

Using charts plotted by Harold Gatty, Post set out for Chicago in the modified Winnie Mae. He planned to extend the trip into a transcontinental dash, but compass failure intervened. However, he did make the 1760-mile Los Angeles to Chicago winning flight in a record 9 hours, 9 minutes, 4 seconds. Second place went to the first Winnie Mae piloted by Art Goebel.

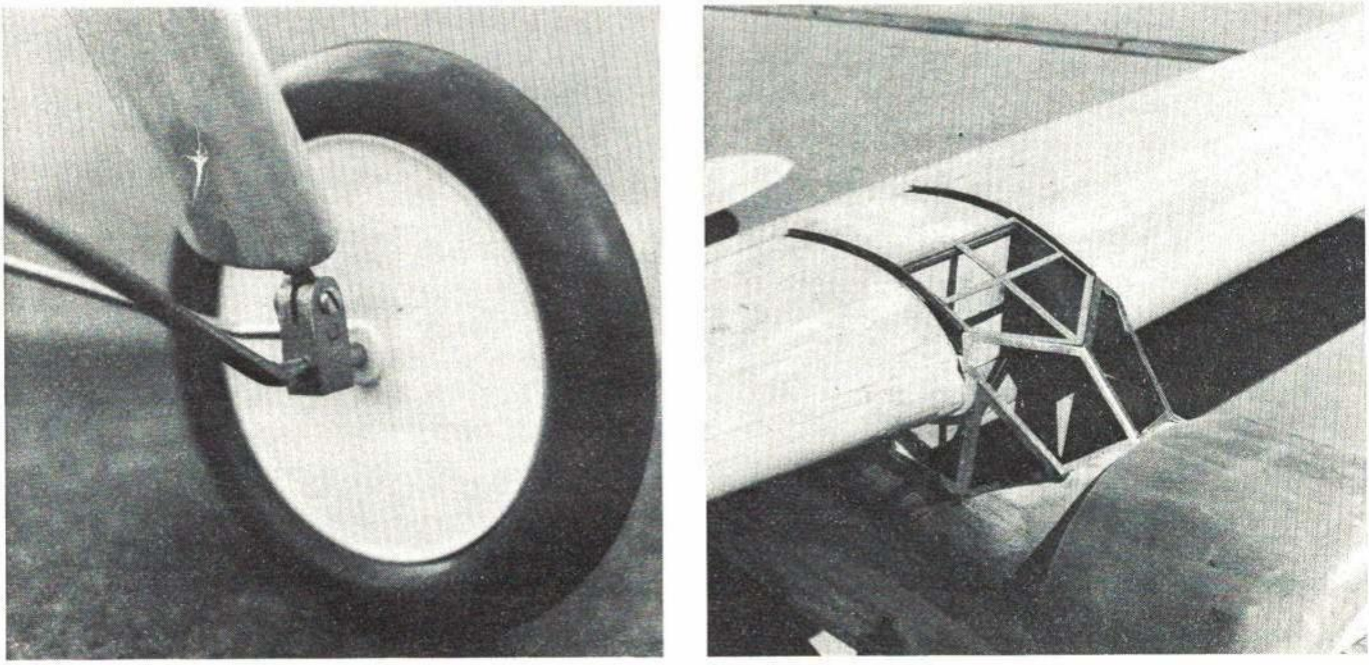
A record world flight then interested both Hall and Post. One of the main attractions at the 1930 Air Races had been the Graf Zeppelin, which had just completed a 21-day, 7-hour and 34-minute round-the-world tour. The popularity of the luxurious Graf Zeppelin was overshadowing the airplane. While airplanes had circumnavigated the earth, there had been mishaps and disasters. In 1930 the future of transoceanic flight looked brighter for dirigibles than for commercial airplanes. However, recent U. S. engine and aircraft development led Post and Hall to feel that America now could prove that, with good equipment and piloting, airplanes were a reliable method of commercial transportation. With Hall's approval, Post asked Harold Gatty to make the flight as navigator.

In January 1931, Wiley ferried the Winnie Mae back to Lockheed to be altered to fit the requirements presented by the unusual flight conditions. First, the engine was taken to Pratt & Whitney for a complete overhaul and re-installation of a military-type supercharger similar to that used the year before.

The wings were left at the same low angle of incidence set prior to the Los Angeles to Chicago race. The ship got a thorough going over. Wiley rearranged the in-



Construction details closely follow the real plane in several areas, notably landing gear mounting and shock-strut operation. In the wingless fuselage, note the dowels in the main bulkhead for front wing hold-down and the up-from-inside wing screw attachment. To mount the wing, one must get a hand through the door (it is functional) and manipulate the screwdriver. Williams scale wheels are used. Perhaps the most difficult part to make is the window frame — careful, patient cutting and bending are necessary. It is a one-piece part. Imagine the task of figuring out the flat pattern for it! Wings are easy, wire-cut foam core and 1/16″ balsa sheet.



strument panel for optimum efficiency and replaced the pilot's seat with a large easy chair for greater comfort and to prevent stiffness during the long flight.

To concentrate the fuel load over the plane's CG, navigator Gatty's two companions for the world trip were to be a pair of giant gas cans! To aid in takeoffs and landings, his accommodations were rather mobile — a folding table and a chair that could be slid back and forth to shift weight as required. Two hatches were cut in the fuselage — one for celestial navigation, the other to calculate drift.

Post and Gatty flew into Roosevelt Field, Long Island, on May 23rd, to begin the trip. Bad weather delayed them. Finally, at dawn, June 23, the Winnie Mae headed east — an attitude she was to maintain for the next 8 days, 15 hours and 51 minutes. She landed back at Roosevelt Field on July 1st. Covering 15,477 miles in only 13 stops, a bedraggled Post and Gatty alighted from the Winnie Mae. The nation went wild.

Later, because of the development of the automatic pilot by Sperry Gyroscope, Post felt he could make an even faster global journey alone. Hall provided the financial backing. On July 15, 1933, Post and the Winnie Mae once more headed east from Floyd Bennett Field. The first stop was Berlin, Germany — and a new speed record. Continuing, they passed over a frustrated Jimmie Mattern, downed near Anadyr, Russia, in an attempt to break the Post/Gatty record. On the evening of July 22nd, the Winnie Mae, beating her previous record, pulled up in front of a vast waiting crowd.

Crossing Russia's Ural Mountains at 21,000 feet intensified Post's idea that the stratosphere was where speed was to be gained. He began to experiment with high altitude flight. Subsidized now by Frank Phillips of Phillips Petroleum, Wiley wanted to make one more attempt at a transcontinental record. Fitted with droppable landing gear and a Bendix supercharger, the Winnie Mae was again altered to suit high altitude.

On March 16, 1935, Post, dressed in a specially-built high altitude suit, left Los Angeles for New York. Forced down in Cleveland by oxygen failure, he nevertheless broke the overland record to Cleveland. Using the high altitude jet streams to advantage, he was able to maintain an average speed of 253 mph and at times hit 340 mph.

Today, the Winnie Mae, in her final high-altitude configuration, is on display at the National Air Museum, Washington, D. C., where she's been since 1935.

Construction

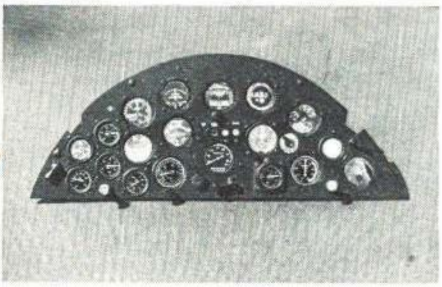
General: This configuration of the Winnie Mae is based on her appearance after conversion to a 5C following an accident. Everything aft of the CG should be as light as possible. About a pound of ballast had to be added directly under the engine to bring the CG within the limits marked on the plans. A Supertigre 71 with a Perry carburetor was used but a good 60 would be adequate.

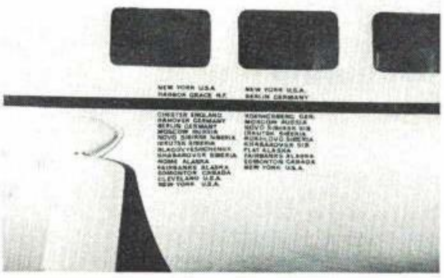
Some of the building techniques may be questioned, but decisions were based strictly on keeping to scale. Photography was used to gather data, to help scale up factory drawings, to produce an almost scale instrument panel, to check appearance during construction, and to make a movie record of the test flight for performance analysis.

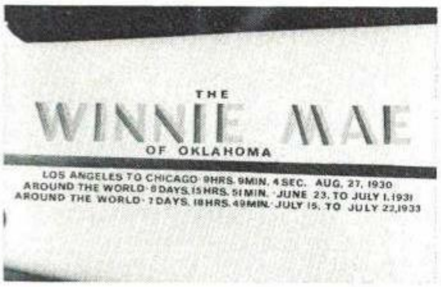
Wing: Foam planked with $\frac{1}{16}$″ sheeting was used. The locations of scale ribs and spars are indicated for building it up. The root rib is a Clark Y 18 and, to finish lofting, an imaginary rib positioned at the tip is a Clark Y 9.47.

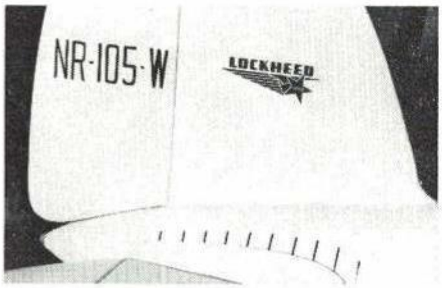
A box structure in the center is used to connect the two foam cores and provide an attach point to the fuselage. Build this, using W2, W3 and two $\frac{1}{8}$″ root ribs notched together. Slot the cores, using white or Titebond glue to secure them to the short spars.

The wing is straight on top at the main spar line and is easily checked when attaching the cores. After the cores are glued to






THE
WINNIE MAE
OF OKLAHOMA
LOS ANGELES TO CHICAGO 9HRS. 9MIN. 4 SEC. AUG. 27, 1930
AROUND THE WORLD 8 DAYS 15 HRS. 51 MIN. JUNE 23, TO JULY 1, 1931
AROUND THE WORLD 7 DAYS 18 HRS. 49MIN. JULY 15, TO JULY 22, 1933



Instrument panel is made by reproducing a photo of real plane's panel to model size, cutting out each instrument, and locating it in glass-faced bezels. Model's panel shown. Another outstanding feature of the model is the extensive lettering. Most of it is done with press-on type. Words "Winnie Mae" are free-handed and in two colors. If anyone develops a fiberglass fuselage Vega, please tell AAM. Many great Lockheed planes used this basic fuselage shape. We will pass on the word about availability.

the box structure, they are sheeted, using contact cement. The leading edge is sheeted with 1/16" balsa, wetted on one side and rolled over the leading edge.

After the sheeting is complete, a standard 1/4" trailing edge is cut to taper (see plans), glued to the trailing edge and sanded to match the existing airfoil. Wing tips are hollow balsa glued to a 1/16" root rib.

Cut out and prepare ailerons using the conventional bellcrank arrangement. The plywood aileron horn is somewhat of a departure in that it doesn't extend below the wing (scale!). This provides considerable throw for lateral control. Install the wire pushrods.

W2 and W3 butt-fit directly down upon the main fuselage formers F3 and F5. W1, the front attach point, attaches behind W2 and should be well-epoxied. A small wood screw or two here won't hurt. With W1 wing tips and ailerons finished, set aside until later.

Fuselage and Empennage: Without a concrete mold to form the fuselage halves, as was done in the original, planking over a preformed skeleton was used. Cut the formers from 3/16" plywood, using great care since the slightest variation can produce strange non-scale contours. Assemble the formers onto the top and bottom keels to check the shape. Use small C-clamps to hold this together while the only two longerons are fitted near the top of the fuselage.

Take the 1/4 x 1/8" longerons and, starting in the front, clamp them in the position as shown. Mark the positions taken on the formers as they are shaped toward the tail. Once satisfied, remove and notch the formers to match.

When getting ready to glue the formers, keels and longerons together, take care F3 and F5 are exactly spaced to match W2 and W3 on the wing. *Do not glue* the lower sandwich of F3. That is done in the next step — the installation of the landing gear. Use Titebond to assemble all formers to keels. Do not glue F11 yet. Check for trueness.

Form the 3/16" main landing gear wire and cut out F3A and F3B which hold it in place. Using epoxy, position the main landing gear wire behind F3 and sandwiched between F3A. (I used several No. 4 bolts, but they may not be necessary.)

Make sure that there is no toe-in. F11 still is not glued. Form the 1/8" rear strut wire to fit over the keel just in front of F5, extending straight toward the axles on the main landing gear wire. Bind with wire and solder as shown below F5.

Construct the two small landing gear blocks which tie the entire assembly together. These are easily made with a hacksaw, drill and file. Position and soft solder the blocks onto the 3/16" wire, then make the final bend in the 1/8" rear strut wires. When the 1/8" rear strut wire is properly positioned, soft solder them into place. Be sure there is no toe-in on the main axles.

Set this aside and work on the tail skid. Install the strong backs as shown on **F9**. Install the doublers between **F9** and **F10** so that the 3/16" wire skid can be placed through the 3/16" hole just drilled.

Prepare a hardwood block, drill and install the skid wire, using 3/16" wheel collars to retain in place. Epoxy and screw this hardwood block to F9. Remove the wire skid and solder together the scale "shoe" on the end of the skid. (A tail wheel would improve ground handling, if desired, but a rudder linkage must be devised. The Winnie Mae had a tail skid. No planking is done yet.

Using No. 4 bolts, install the two metal (aluminum) main shock absorber attach points, positioning them as indicated. Set this aside and construct the complete empennage. Install hinges and plank. The control surfaces hinge similar to those on the deBolt Sonic Cruiser. Install the constructed empennage after removing F11, which is not yet glued.

Align and square the horizontal stabilizer to the vertical fin and glue directly to **F10**. Now glue in the **F11** to hold in everything. To check alignment, lay a straightedge on top of F3 in the front and sight and/or measure to assure correct position. Titebond again. Zero incidence is required on the elevator, so check this against the flat bottom on the wing.

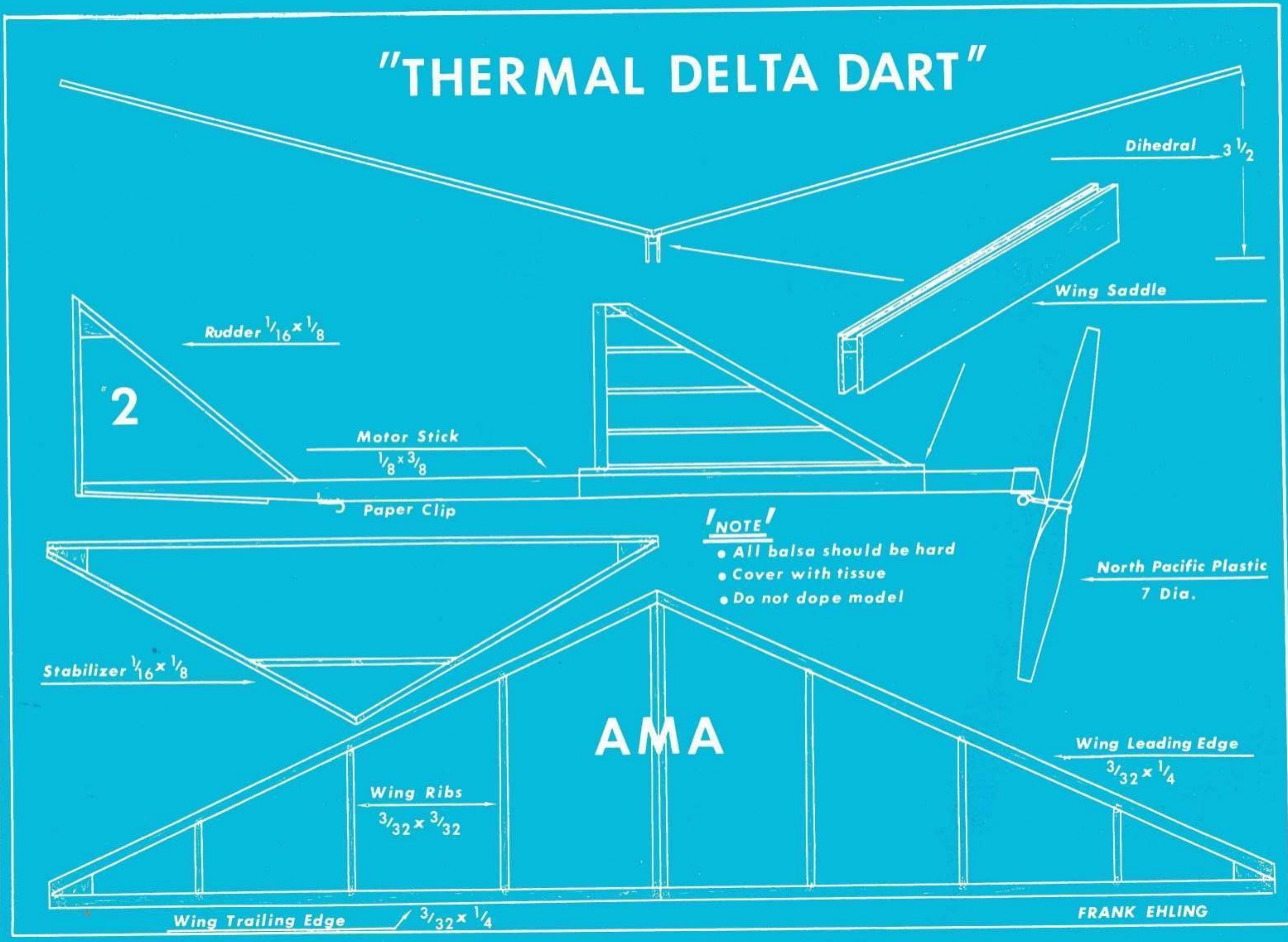
There is just enough room in or near the tail cone to connect the Nyrod pushrods to the rudder and elevator horns. The two Nyrods start just in front and through F3 where the rudder and elevator servos will go. The pushrods run down and along the keel beneath floor level until they get to the rear where they jog up a bit to connect to the rudder and elevator.

At this point, rough in the servos and check the empennage throw. Plus or minus 5/8" on the elevator and all the rudder available

Continued on page 75

Start of first flight. It flew best with a hand-carved 18-4 prop. No trim changes were needed, takeoff and landing are dicey.

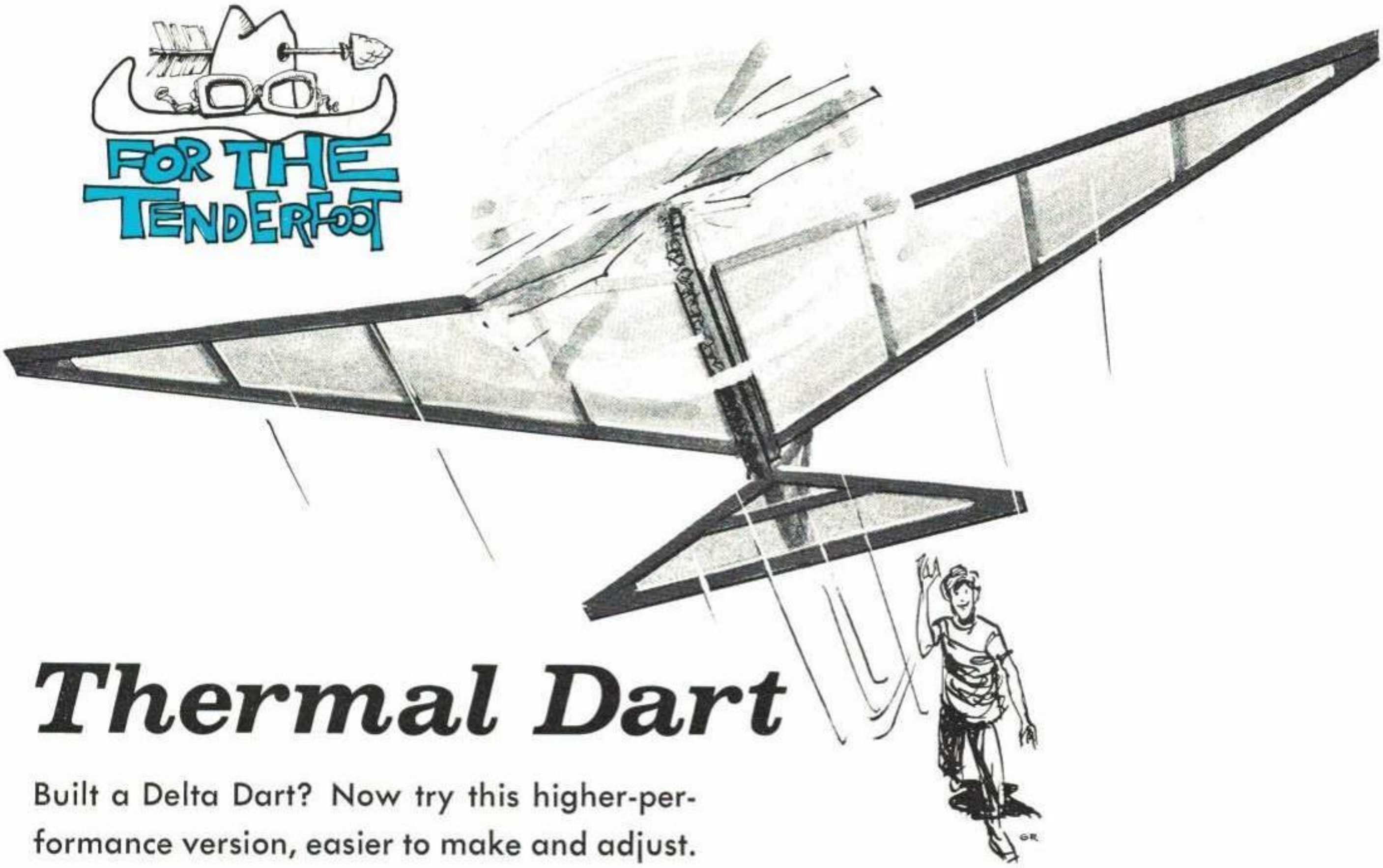
"THERMAL DELTA DART"



NOTE
- All balsa should be hard
- Cover with tissue
- Do not dope model

FULL SIZE PLANS AVAILABLE — SEE PAGE 70

FOR THE TENDERFOOT



Thermal Dart

Built a Delta Dart? Now try this higher-performance version, easier to make and adjust.

FRANK EHLING

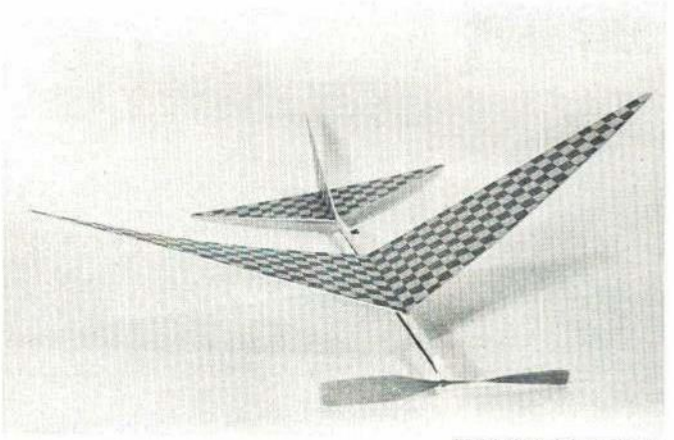
ALTHOUGH this model is easy to construct, building a Delta Dart or AMA Cub first will aid in making a better Thermal Dart. It uses a larger propeller and a stronger rubber motor than the Delta Dart, thus enabling it to climb higher, and has a larger wing, which allows it to glide longer. By gluing the wing to the wing saddle, the wing can slide along the motor stick, making it possible to adjust the model to obtain good glides without stalling after the rubber is unwound. A little practice flying will indicate the best wing location for a smooth glide.

Begin construction by laying Saran Wrap over the entire full-size plan; over this place the tissue covering. Hold both layers in place with small pieces of Scotch Tape at the corners. Start on the wing by cutting the leading and trailing edges from 3/32 x 1/4". Cement them to the tissue and then add the ribs, using as little glue as possible. To make the wing saddle, cement a piece of 1/8" sq. directly below the dihedral joint (the two center ribs) when putting the dihedral in the wing. When this has dried, the side of the saddle can be cut from 1/16" sheet and cemented to the 1/8" sq. as shown on the front view of the wing.

The stabilizer (tail) is constructed like the wing. However, note that the stabilizer and rudder are made out of 1/16 x 1/8". It is important to keep the tail end of this model light. When building the rudder, apply cement only within the rudder area on the motor stick. Bend a paper clip and cement it to the motor stick as shown. On the front end put the prop unit in place. Assemble the model by slipping the wing saddle onto the motor stick and hold it in place with two small rubber bands. Get a loop of 1/4" flat rubber 18" long and connect it to the prop and rear hooks. Tie the rubber strand into a loop using a square knot.

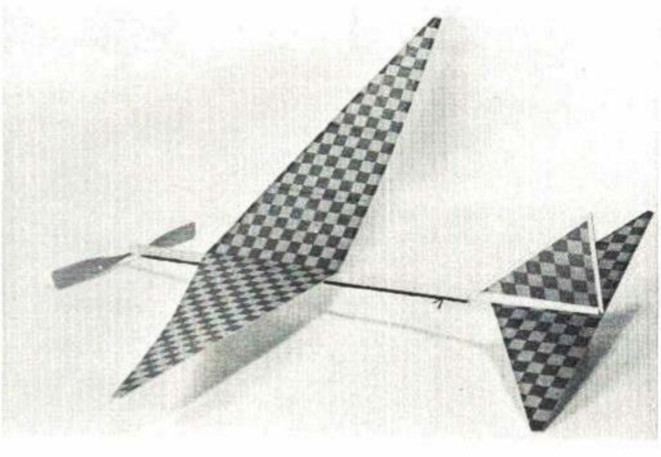
Place the wing as indicated, and wind the propeller until the rubber has a single row of knots. Release the propeller and gently push the model forward. Observe the flight. If the model doesn't climb, slide the wing saddle forward. If it climbs up and then stalls, move the wing back. When a good climb and smooth glide are achieved, wind the propeller to two rows of knots and be ready for a good chase after the model.

After successfully building and flying this model, construct a second wing using 1/16 x 1/8" wood for the entire assembly. The wing is cemented where the first wing had been balanced on the motor stick. This will produce a lighter model, which will climb and glide much better. However, it is more liable to break and should be flown outdoors only when it is calm.



Both photos, Frank Pierce

Size of Thermal Dart permits experimenting with wood sizes to improve performance, but keep same areas and dimensions.



In case you wonder, checkerboard pattern tissue should be available at leading hobby shops. Prop sanded to thin and lighten.

NEW PRODUCTS CHECK LIST

PHOTOS / BILL COONS

TEXT / HOWARD McENTEE

These products seen at the major 1970 model airplane and radio control trade shows.

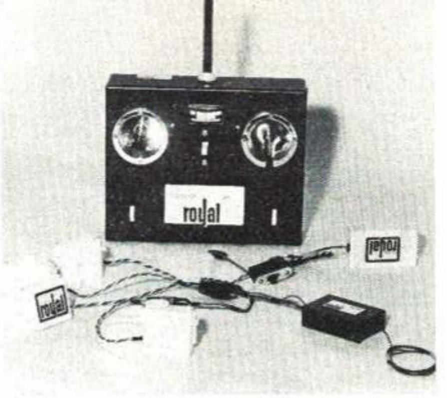
The **5RS digital propo control system** offered by **Larson Electronics** is an outgrowth of the first mass-produced digital control system. Gordon Larson and Frank Kagele, who developed the digital propo concept for Bonner Specialties, now have their own firm. The new Larson 5RS has many of the Digimite 4RS features, as well as many improvements. Transmitter has two enclosed control sticks, offered in Mode I or II; operates on 12V; has built-in charger. Receiver has fully integrated-circuit decoder. Sensitivity holds constant over wide battery voltage variation. Servos' exclusive "harmonic drive" replaces normal reduction gearing resulting in a much-improved drive. Feedback pot is guaranteed for life of servo. Neutral shift is less than 3% over extreme shifts in both temperature and battery voltage. Complete system, $349.95 with all nickel-cad cells, four servos. Available on all standard RC frequencies. At slight extra cost, the Orbit PS-4D servo may be substituted. **Larson Electronics**, 2289½ S. Grand Ave., Santa Ana, Calif. 92705

Orbit LSI (Large Scale Integration) servo is something new in electronics. This integrated circuit (IC) is extremely compact, yet includes every electronic component in the servo except the motor and feedback pot. The IC actually is a flat plate (see photo), but it is potted for protection and for firm lead attachment. This fills the space in the servo case left by removal of the much larger standard servo amplifier. The IC is used in the tiny PS-4 servo, which has rotary output, weighs only 1.2 oz. Besides lower weight, greatly increased reliability is anticipated. **Orbit Electronics Inc.**, 11601 Anabel Ave., Garden Grove, Calif. 92640

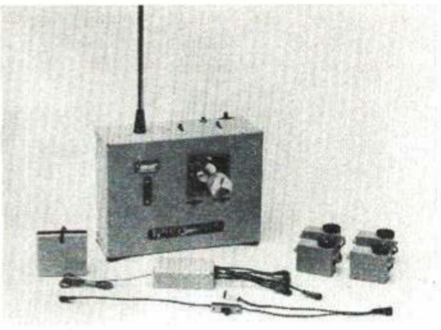
Commander Gem superhet is a considerably smaller version of the Ace Commander, in size and in weight. Both are crystal-controlled superhets; however, the Commander has double-ended output; the Gem, single-ended circuitry. Larger receiver measures 1 13/16 x 1 5/16 x 5/8", weighs about an ounce with antenna and leads, but no connectors. The Gem is 1½ x 1 1/16 x 9/16", weighs 0.7 oz. — a worthwhile saving. Operation of the two receivers is understood to be identical (except for the different output circuits). **Ace Radio Control**, Box 301, Higginsville, Mo. 64037

Introduced at Toledo was a **Micro-Avionics transmitter** in molded plastic case. Size was similar to a standard two-stick metal case, but molding permits the exotic shape shown. Micro showed this to get modelers' reactions, which were generally favorable. The prototype case was plain white plastic, but the final model may come out in "M.A. orange." Transmitters in the new molded case are not available yet, although this eventually may become standard. **Micro-Avionics**, 11601 Anabel Ave., Garden Grove, Calif. 92640

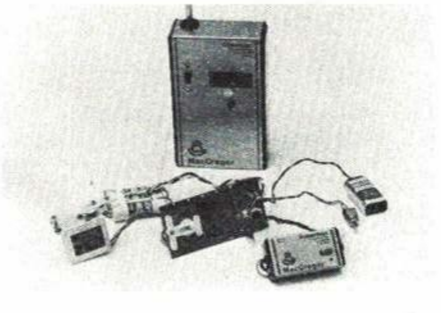
The Kraft KP-3B system is intended especially for cars, boats, simpler RC plane installations. Transmitter case is substantially smaller than the four- and six-control units. One control stick moves vertically, the other from side to side, with trim control for each stick. The third control is operated by a small lever on the lower case front. For car use, the centering spring on one of the main levers may be removed, thus adapting it to throttle actuation. The right hand (side-to-side) stick normally will be used for steering any sort of model. Weight of the KP-3B system with two of the new KPS-11 servos and KP-4C battery pack (225 mah) is 7.7 oz. System costs $199.95. KPS-11a servos have only rotary output; for $5 extra per servo, system may be had with any Kraft servo, including the tiny KPS-12. The new Kraft receivers have sockets on one



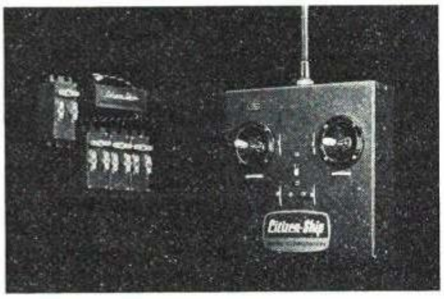
Updated Royal system with thin transmitter, tiny PS-4 servos, and 450-ma battery.



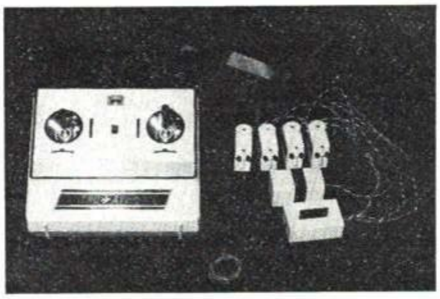
Smooth open gimbal stick on 6-channel Pro-Line systems. KPS-9 and -11 servos offered.



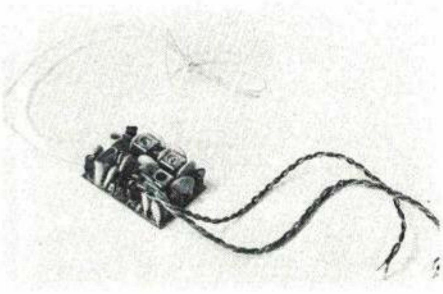
Complete sequential single-channel McGregor has changeable-at-the-field crystals.



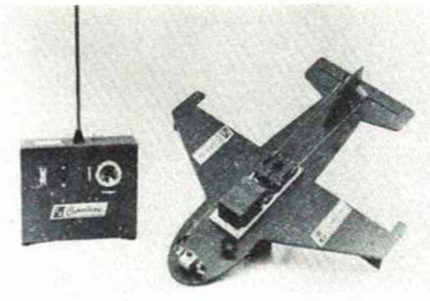
Curtis Dyna-Products is improving the C-S line. Now with solid-state IF in receivers.



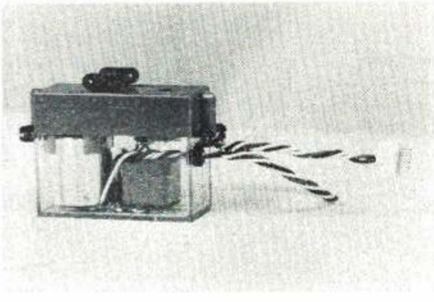
Fascinating teaser from Micro Avionics—all plastic transmitter. It's light and handy.



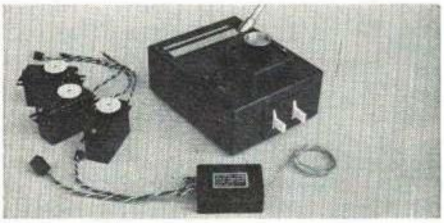
Miniaturized ACE Commander is smallest single-channel superhet receiver available.



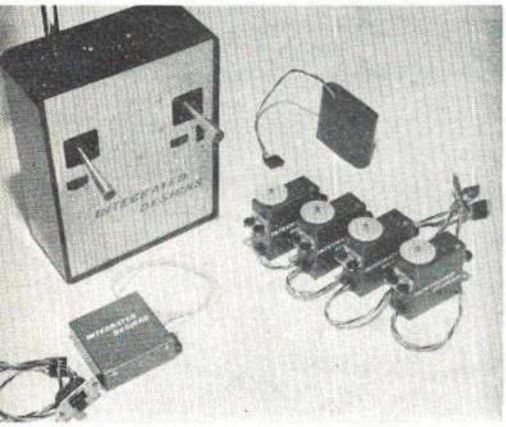
Logictrol Champion series has amplifiers in receiver unit. Easy to make, costs less.



FEB means functional electronic block. A potted servo amplifier in Logictrol servos.

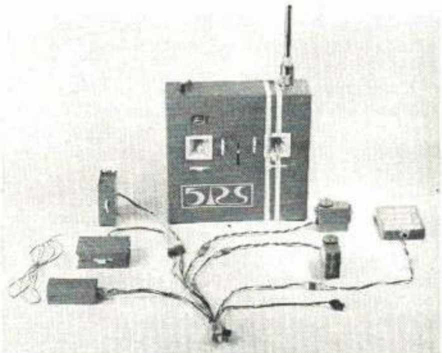


New Orbit RC car radio has exotic transmitter shape for easy use of steering, throttle, and shifting. Frequency changeable at the track by installing different crystals. PS-3 servos used, fast, accurate, and rugged. Note antenna angle.



Integrated Designs uses IC throughout and will feature new KPS-11 servos. Low cost.

Reliable Canadian system, unchanged since 1969, uses PS-3 servos, integrated decoder.

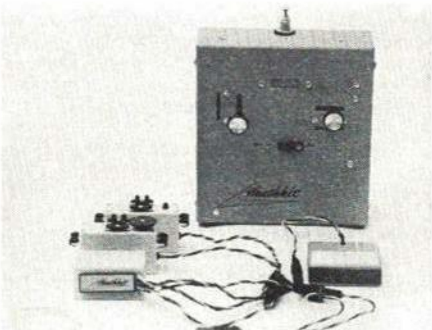


Larson 5RS offers Bonner or PS-4 servos with tiny receiver package. 10 oz. weight.

Five-channel MRC is reliable import with dual-rack servos, comfortable transmitter.

Min-X systems use small receiver and EK dual-rack servos. Strong transmitter signal.

Kraft has plug block in receiver with gold-plated connectors. Lots of accessories.



Heath's 3-channel is great in gliders, RC cars, and boats. Note new compact receiver.

end of receiver case in which to insert plugs from servos and battery harness. Harness incorporates a charging jack, so no system connectors need be disconnected to charge the battery. **Kraft Systems, Inc.,** 450 W. California Ave., Vista, Calif. 92083

Updated **Royal Classic digital system** brings thinner transmitter with recessed antenna mount. Now collapsed antenna's projection above case is much lower. Kraft two-axis or three-axis sticks available. Single-deck receiver uses low drain IC's and FET RF amplifier. Wide variety of Orbit, Kraft, Logictrol servos offered; all have Classic all-silicon amplifiers. Switch harness now has separate plug for battery charging. Modified battery packs use new sizes of Gould cells; both 450 and 250 maH packs are now lighter, somewhat smaller. Lightest airborne weight for four-servo Classic system is 9-oz. 180-degree servos are available. Complete four-control system with Royal sticks on transmitter, $349.95. **Royal Electronics Corp.,** 2119 S. Hudson St., Denver, Colo. 80222

EK Champion 3-control single-stick outfit, Logictrol's newest addition, is lower-cost system with either single or dual-stick transmitter. Single-stick rig uses EK's standard stick assembly, has screwdriver adjustment for spring tension. Trims for the two-stick movement directions are at left and below front panel plate. Third control is small lever at top rear edge of case. New production techniques allow price reductions in Champion line. All servo amplifiers are in the receiver. Connection to servos and to power supply are via the compact EK connectors; only the Log Pro-Series now has connector sockets right in receiver. Individual servos are $12.95. Now servos can be left in each plane. All frequencies available at same price. Dual charger built into transmitter. Three-control system with two servos, single stick, $237.00. Also available in four-control, dual-stick version. **EK Products, Inc.,** 3233 W. Euless Blvd., Hurst, Texas.

MacGregor single-channel control systems, imported from England, fill the void left by most U. S. manufacturers' concentration on the multi-control system field. MacGregor units go for fundamentals — relay-type receivers, some transmitters with a plain push-button for keying, super-regens. Compact relayless receivers are offered too. A welcome feature is plug-in crystals for instant frequency change, for transmitters and super-het receivers. Purchased separately units cost more than matched transmitters and receivers. Least expensive combo is relayless regen receiver and transmitter with button keying, $46.95 (in Canada); most expensive is transmitter with built-in coder for motorized servo, relay superhet, $89.95. All units operate on 9 volts. Several types of motorized sequence servos and switchers offered, also escapements. Electronics are modern — silicon transistors throughout. Four frequencies in 27 MHz band — Red, Orange, Yellow, Green. **M. K. (Canada) Distributing Company,** 3187 Bathurst St., Toronto 19, Ont., Canada

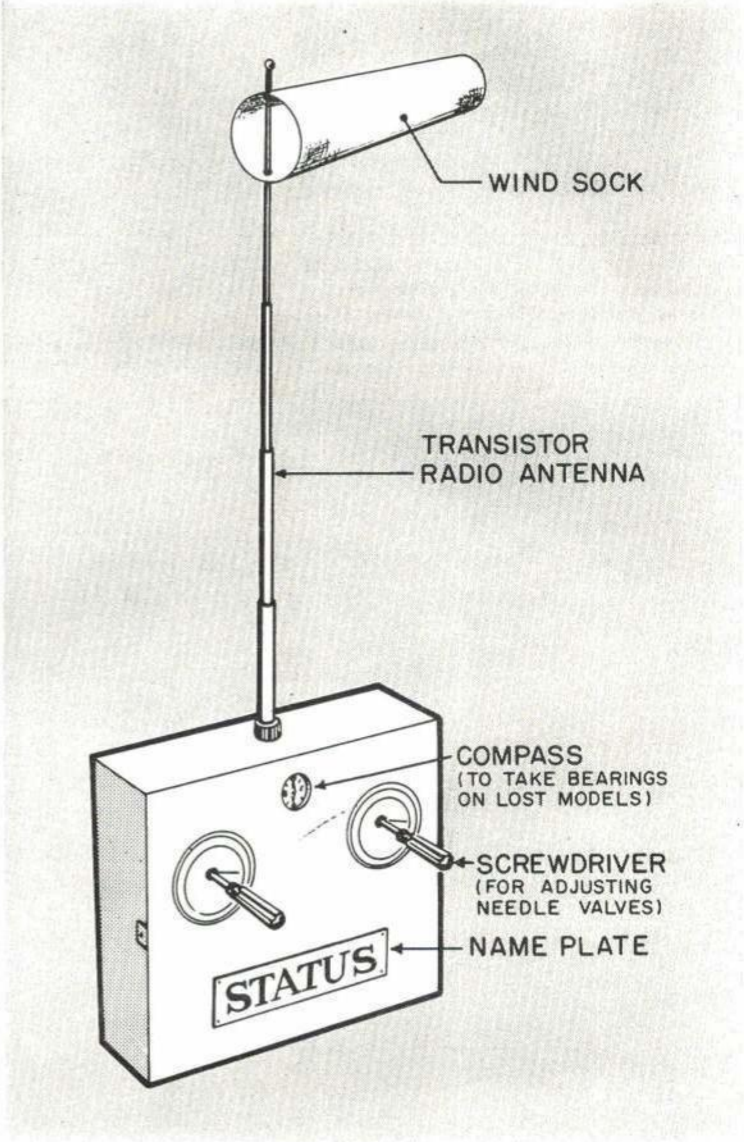
Min-X radio equipment design is based on a potent transmitter and relatively insensitive receiver. This prevents interference from outside or inside plane. The new Astromite 72 MHz systems have the same concept. They come in four- or six-channel configurations, with either dual or single Kraft sticks. Vinyl-clad transmitter has integral charger; integrated circuitry featured in receivers. Airborne system weight with four servos, 13½ oz.; operating temp. range, 20-140 degrees F; servo thrust, 3½ lb. or over. Four-control single-stick outfit, $349 complete; dual stick, $24 less. Also available on 27 MHz.

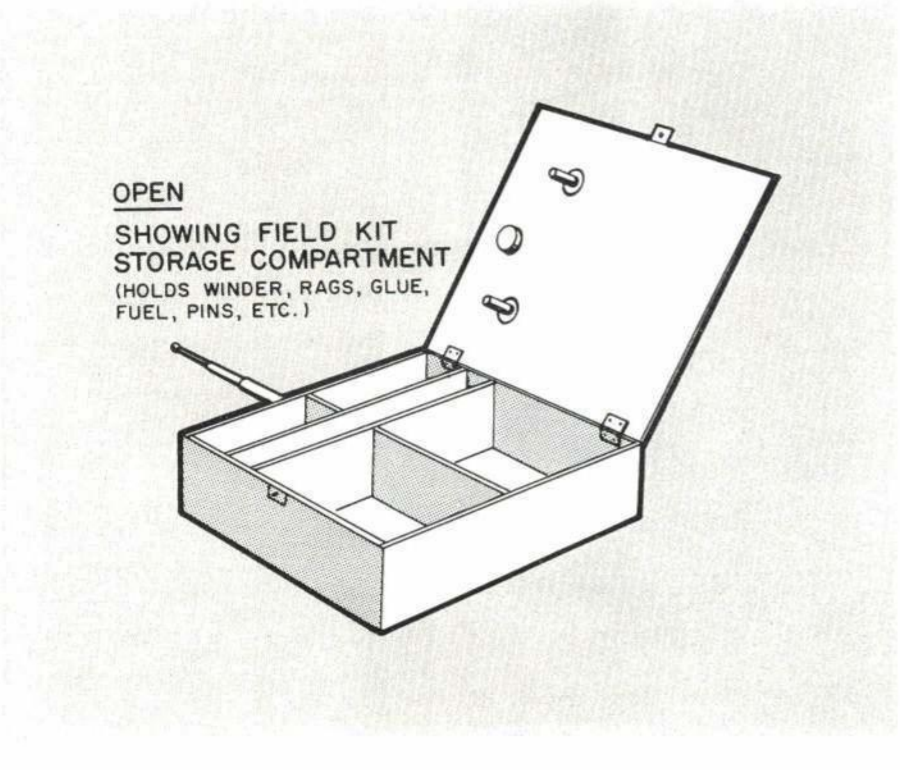
Continued on page 72

Field kit for a Free Flighter

Up your prestige at low cost!

BILL HANNAN WITH RUSS BARRERA


WIND SOCK
TRANSISTOR RADIO ANTENNA
COMPASS (TO TAKE BEARINGS ON LOST MODELS)
SCREWDRIVER (FOR ADJUSTING NEEDLE VALVES)
NAME PLATE
STATUS

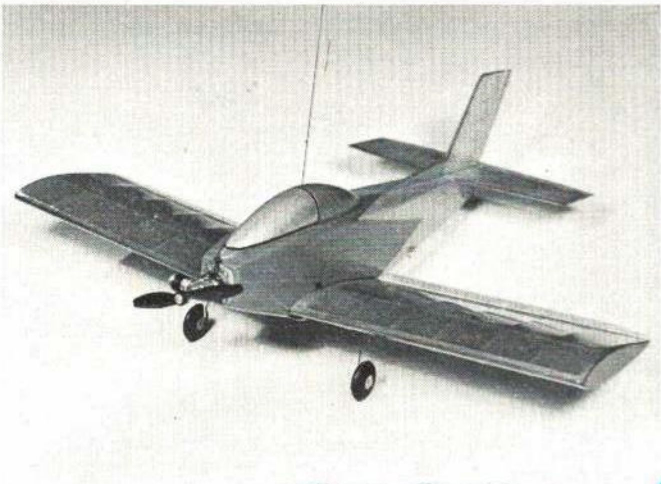

OPEN
SHOWING FIELD KIT STORAGE COMPARTMENT
(HOLDS WINDER, RAGS, GLUE, FUEL, PINS, ETC.)

WHAT'S wrong with free flight? Nothing, actually. It is just that it lacks that certain charisma associated with more esoteric forms of model flying. Thus, the average free-flighter suffers from feelings of inferiority and rejection at his local flying field.

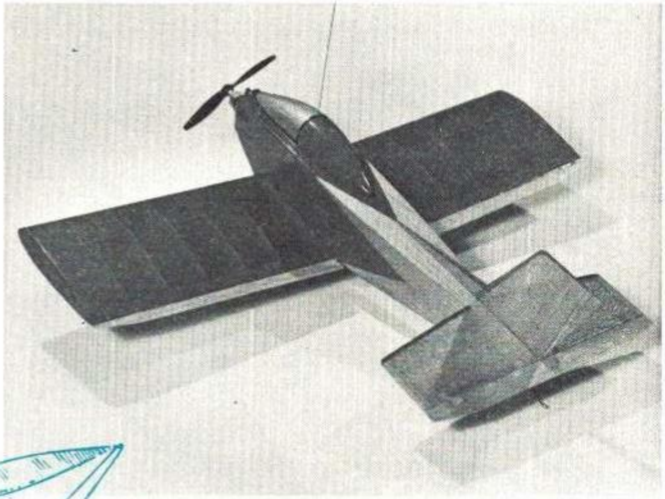
In analyzing the causes of this type of complex, we reached the conclusion that the problem stems from the fact that free-flighters have no symbols of status in the model-building community. Like the Cowardly Lion in The Wizard of Oz, who needed a medal before he could feel brave, and his friend the Scarecrow, who needed a diploma before he would rely upon his own brains, free-flighters need some tangible sign of recognition in order to regain their former high position of respect.

Details of our prescribed panacea are disclosed herewith. Merely equipping yourself with one of these easy-to-construct tokens of social rank will do much to assure your acceptance on any flying field, and most assuredly will bolster your ego in the process.

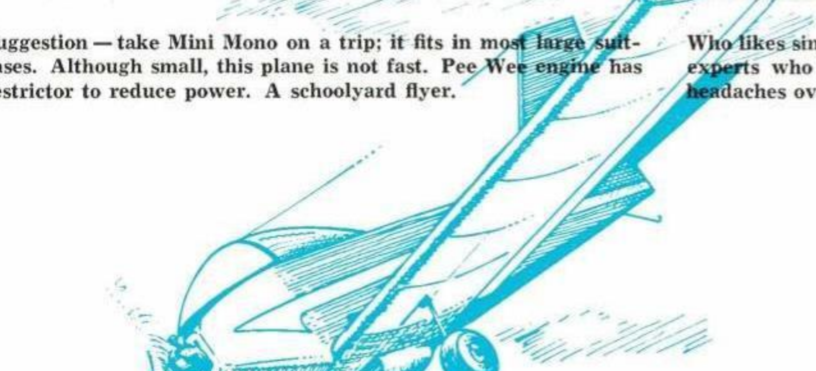
Particulars of fabrication are self-evident, and the choice of materials is left to the discretion of each patient-er-builder. Naturally, for maximum snob appeal and for reasons of aesthetics, your project should be finished in a manner befitting such a piece de resistance. Inset emeralds are suggested, but if that approach seems a bit gauche, a simple application of genuine gold leaf, unborn mongoose skin, or lapis lazuli will suffice.



Suggestion — take Mini Mono on a trip; it fits in most large suitcases. Although small, this plane is not fast. Pee Wee engine has restrictor to reduce power. A schoolyard flyer.



Who likes single channel? Two groups: low-budget beginners and experts who think it is more sheer fun than getting Excedrin headaches over powerful, fast, multi-bombs or 707's.



FULL-SIZE PLANS RIGHT HERE

"Mini Mono"

Lively small-field flyer
uses 020 and pulse aileron/
elevator. Stunts like crazy, an expert's delight.

RALPH H. PEARSON

WHEN building small models over the past several years, I first used escapement and then Adams magnetic actuators. Rudder alone was satisfactory; next some elevator control was used to obtain pitch trim in flight for mild dives and flare-outs for landing. The models ranged from 17 to 30 inches, with Pee Wee 020's for power.

It was while devising a plate for pushrod operation of rudder and elevator that I decided, for good measure, to use this plate for ailerons with elevator trim. The resulting model became the Mini Mono. Its performance was gratifying. Initial flights were surprisingly smooth with beautiful aileron turns. As a bonus (to me, at any rate), this plane is not as fast as it looks. However, a Vogt restrictor is used on the Pee Wee 020. Even with the engine set wide open, some of the exhaust area is still covered, and the loss of rpm is quite evident. By all means, use a restrictor on the first flights.

I use 3.6 volts (3-225's) on actuator, tapping the battery pack at 2.4 volts for Ace Commander DE Superhet. With 3.6 volts to actuator, six to eight flights per charge is the limit, but that is usually sufficient.

With a transmitter not equipped for rate, the elevator trim feature must be eliminated. In this case, 2.4 volts can be used for receiver and actuator. This makes for simpler installation and a lighter model. In any case the transmitter must have a width ratio of more than 80-20.

Do not try rudder only on this particular model. For ailerons only, keep tail surfaces extra light, put aluminum straps on the elevator hinge-line, and move the actuator forward slightly for balance. Either way, the overall weight should be kept to 10 oz. or less. The original model came out at 9.5 oz.

Because the Mini Mono plans are presented full-size, the building instructions are brief, touching only on special construction details. To build the model, cut out the plan pages and make Xerox copies of each. Scotch-tape them together in the proper relationship and use them as working plans.

Mark bulkhead locations on fuselage sides and assemble upside down over the centerline. If doublers are left off until the sides are pulled together at nose and tail, less distortion results. When dry, add doublers, 1/8" sq. strips, and firewall braces. Also add wing-retaining tongue at trailing edge. Leave top and bottom covering for later when all equipment, location, and operation have been checked out.

The aileron-elevator plate can now be made, using dimensions taken from the views on the plan. Assemble the parts with epoxy and thread over a piece of wire the same size as the actuator shaft. A little wax on the wire will aid removal of the assembly after the epoxy has hardened.

Check wing fit and if satisfactory glue leading edge dowels in place. When this is dry, drill hole for retaining screw.

Cut out ailerons and tail group; hinge as desired. Surfaces must be able to flop of their own weight. Aileron horns are made from 1/32" wire, nylon or brass tubing, and a drilled nylon fitting.

Mount actuator in the wing, connect linkage (z bend is for adjusting length) and check for smooth operation. Use inner holes on plate and restrict actuator movement to 45 degrees each side of neutral. Ailerons should move approximately 15 degrees each side of neutral.

Make a pushrod from medium 1/8" sq. and 1/32" wire. The rod is held in place at the elevator horn with a slice of small fuel-line tubing used as a retainer. It also acts as a sort of centering device. Mount the wing on the fuselage and connect elevator pushrod. Check operation of the elevator for 1/4" total movement — more up than down.

Remove wing, radio, etc. Drill holes for the engine to one side of the firewall so that 3 degrees of right thrust will center prop. Now finish fuselage top and bottom.

Shape a canopy from soft balsa and place it so that the back half can be removed rearward for removal. Fuselage under the back half is cut out slightly smaller than the canopy. Reach into this opening with tweezers to attach the pushrod to the plate.

Continued on page 72

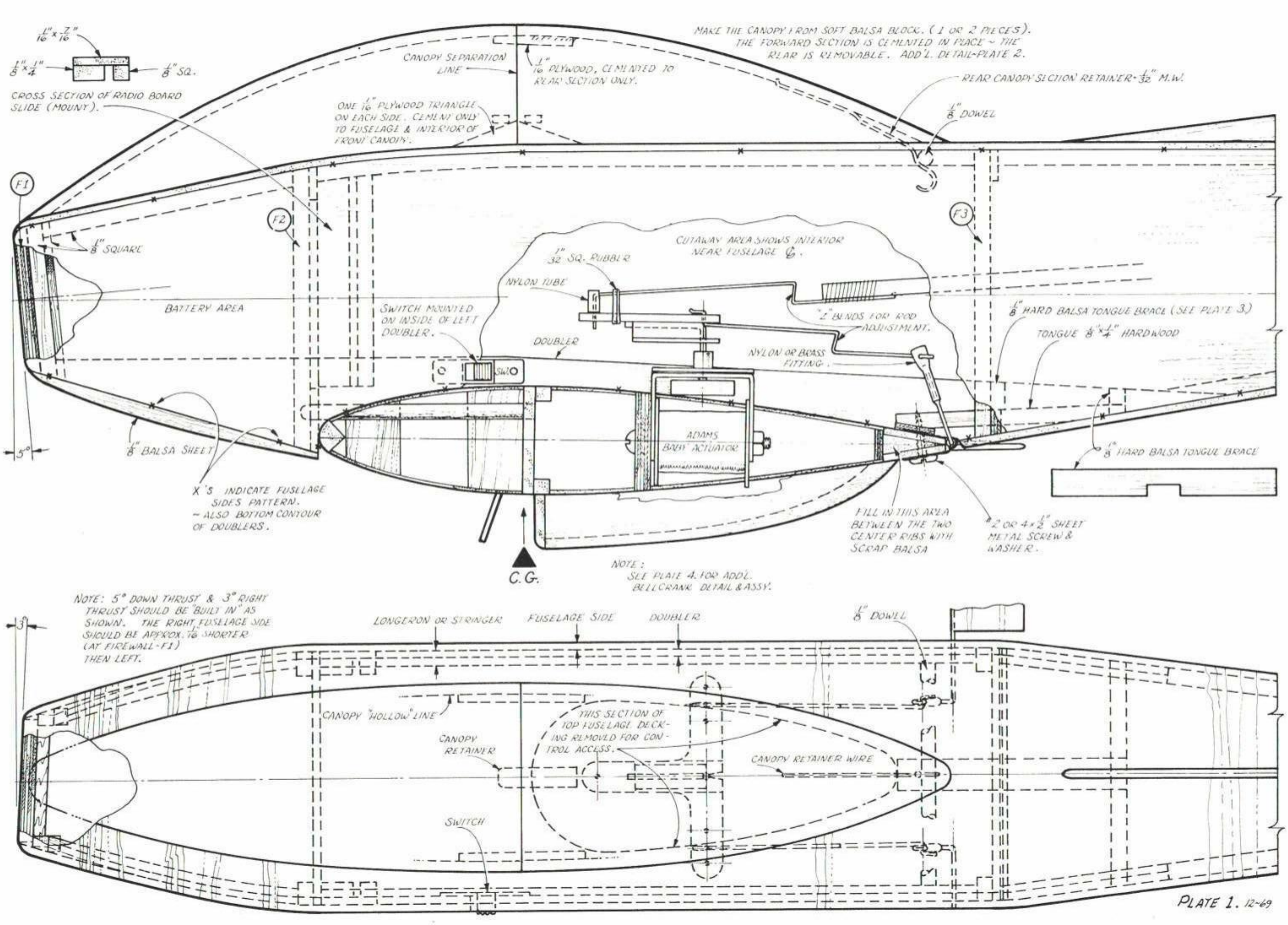
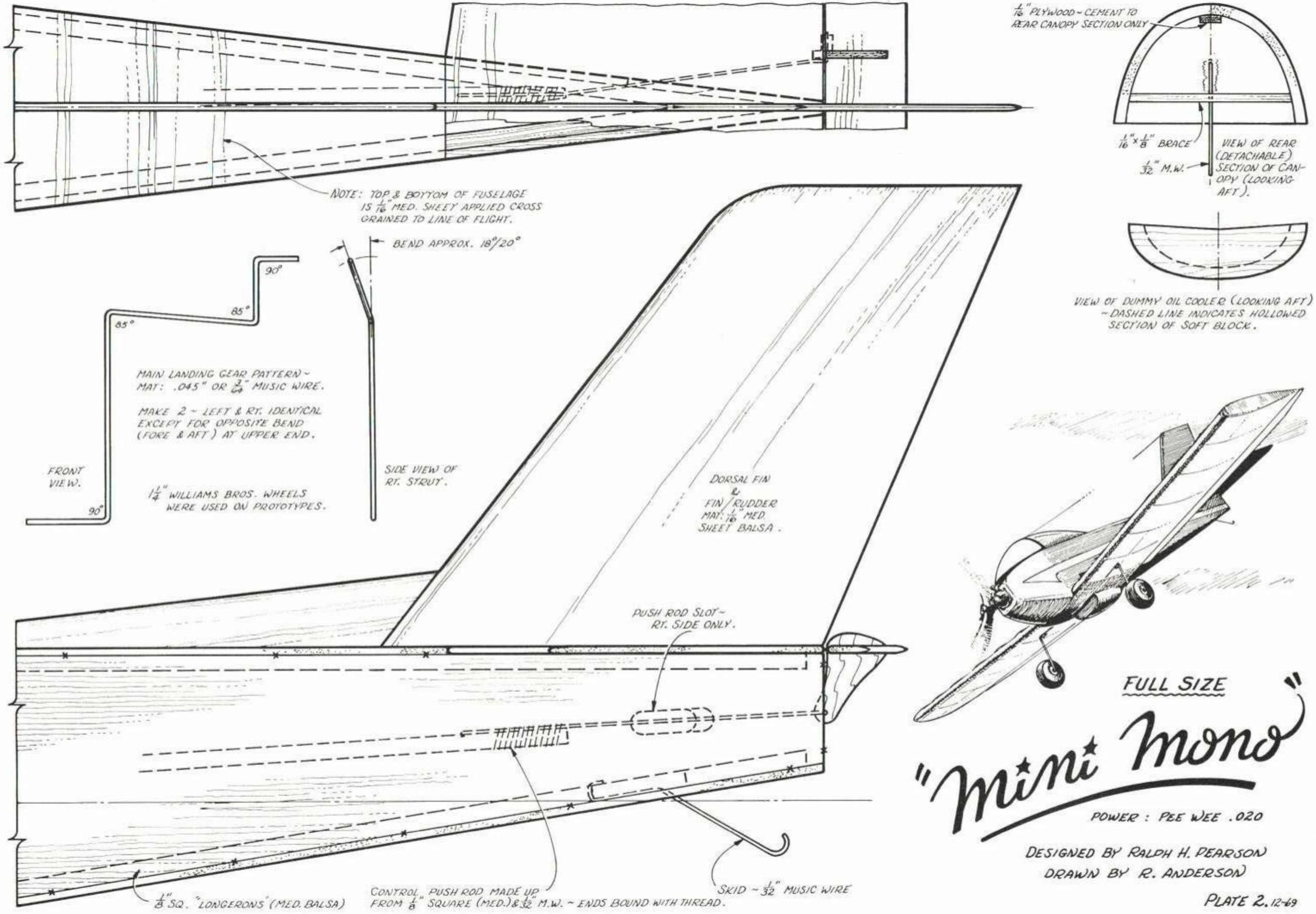

1/16" x 7/16"
1/8" x 1/4"
1/8" SQ.
CROSS SECTION OF RADIO BOARD SLIDE (MOUNT).
CANOPY SEPARATION LINE
1/16" PLYWOOD, CEMENTED TO REAR SECTION ONLY.
ONE 1/16" PLYWOOD TRIANGLE ON EACH SIDE. CEMENT ONLY TO FUSELAGE & INTERIOR OF FRONT CANOPY.
MAKE THE CANOPY FROM SOFT BALSA BLOCK. (1 OR 2 PIECES). THE FORWARD SECTION IS CEMENTED IN PLACE ~ THE REAR IS REMOVABLE. ADD'L. DETAIL-PLATE 2.
REAR CANOPY SECTION RETAINER-1/32" M.W.
1/8" DOWEL
F1
F2
F3
1/8" SQUARE
BATTERY AREA
CUTAWAY AREA SHOWS INTERIOR NEAR FUSELAGE ℄.
1/32" SQ. RUBBER
NYLON TUBE
SWITCH MOUNTED ON INSIDE OF LEFT DOUBLER.
SW.
DOUBLER
"Z" BENDS FOR ROD ADJUSTMENT.
NYLON OR BRASS FITTING.
1/8" HARD BALSA TONGUE BRACE (SEE PLATE 3)
TONGUE 1/8" x 1/4" HARDWOOD
ADAMS BABY ACTUATOR
1/8" BALSA SHEET
5°
X'S INDICATE FUSELAGE SIDES PATTERN. ~ ALSO BOTTOM CONTOUR OF DOUBLERS.
C.G.
FILL IN THIS AREA BETWEEN THE TWO CENTER RIBS WITH SCRAP BALSA
#2 OR 4 x 1/2" SHEET METAL SCREW & WASHER.
1/8" HARD BALSA TONGUE BRACE
NOTE: SEE PLATE 4 FOR ADD'L. BELLCRANK DETAIL & ASSY.
NOTE: 5° DOWN THRUST & 3° RIGHT THRUST SHOULD BE "BUILT IN" AS SHOWN. THE RIGHT FUSELAGE SIDE SHOULD BE APPROX. 1/16" SHORTER (AT FIREWALL-F1) THEN LEFT.
3°
LONGERON OR STRINGER
FUSELAGE SIDE
DOUBLER
1/8" DOWEL
CANOPY "HOLLOW" LINE
CANOPY RETAINER
THIS SECTION OF TOP FUSELAGE DECKING REMOVED FOR CONTROL ACCESS.
CANOPY RETAINER WIRE
SWITCH

PLATE 1. 12-69


$\frac{1}{16}$" PLYWOOD ~ CEMENT TO REAR CANOPY SECTION ONLY
$\frac{1}{16}$" × $\frac{1}{8}$" BRACE
$\frac{1}{32}$" M.W.
VIEW OF REAR (DETACHABLE) SECTION OF CANOPY (LOOKING AFT).
VIEW OF DUMMY OIL COOLER (LOOKING AFT) ~ DASHED LINE INDICATES HOLLOWED SECTION OF SOFT BLOCK.
NOTE: TOP & BOTTOM OF FUSELAGE IS $\frac{1}{16}$" MED. SHEET APPLIED CROSS GRAINED TO LINE OF FLIGHT.
BEND APPROX. 18°/20°
90°
85°
85°
90°
MAIN LANDING GEAR PATTERN ~ MAT: .045" OR $\frac{3}{64}$" MUSIC WIRE.
MAKE 2 ~ LEFT & RT. IDENTICAL EXCEPT FOR OPPOSITE BEND (FORE & AFT) AT UPPER END.
FRONT VIEW.
$1\frac{1}{4}$" WILLIAMS BROS. WHEELS WERE USED ON PROTOTYPES.
SIDE VIEW OF RT. STRUT.
DORSAL FIN & FIN/RUDDER MAT: $\frac{1}{16}$" MED. SHEET BALSA.
PUSH ROD SLOT ~ RT. SIDE ONLY.
$\frac{1}{8}$" SQ. "LONGERONS" (MED. BALSA)
CONTROL PUSH ROD MADE UP FROM $\frac{1}{8}$" SQUARE (MED.) & $\frac{1}{32}$" M.W. ~ ENDS BOUND WITH THREAD.
SKID ~ $\frac{1}{32}$" MUSIC WIRE

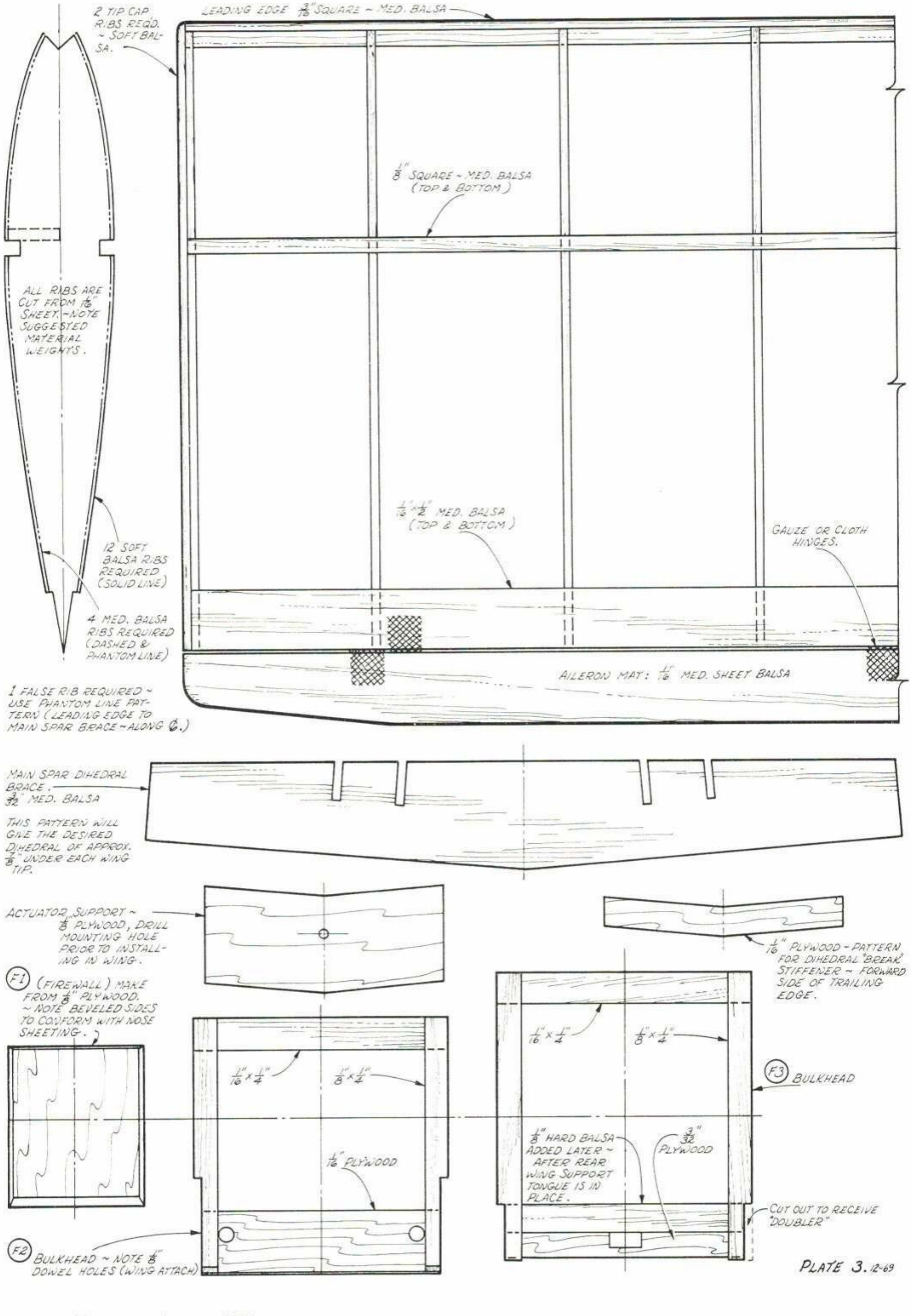
FULL SIZE

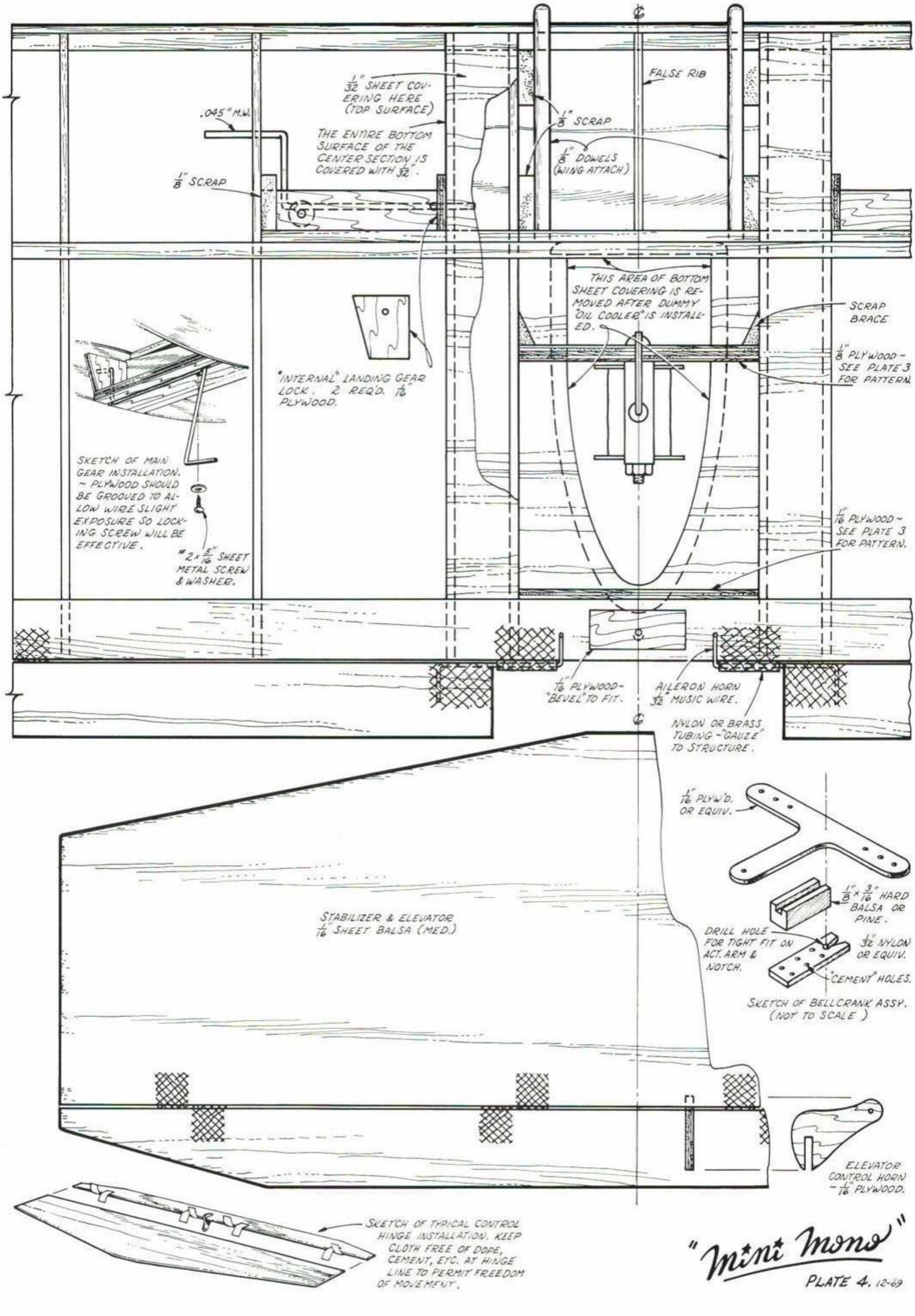
"Mini Mono"

POWER : PEE WEE .020

DESIGNED BY RALPH H. PEARSON
DRAWN BY R. ANDERSON

PLATE 2, 12-69


2 TIP CAP RIBS REQ'D. ~ SOFT BALSA.
LEADING EDGE 3/16" SQUARE ~ MED. BALSA
1/8" SQUARE ~ MED. BALSA (TOP & BOTTOM)
ALL RIBS ARE CUT FROM 1/16" SHEET. ~ NOTE SUGGESTED MATERIAL WEIGHTS.
1/16" x 1/2" MED. BALSA (TOP & BOTTOM)
GAUZE OR CLOTH HINGES.
12 SOFT BALSA RIBS REQUIRED (SOLID LINE)
4 MED. BALSA RIBS REQUIRED (DASHED & PHANTOM LINE)
AILERON MAT: 1/16" MED. SHEET BALSA
1 FALSE RIB REQUIRED ~ USE PHANTOM LINE PATTERN (LEADING EDGE TO MAIN SPAR BRACE ~ ALONG ℄.)
MAIN SPAR DIHEDRAL BRACE. 3/32" MED. BALSA
THIS PATTERN WILL GIVE THE DESIRED DIHEDRAL OF APPROX. 7/8" UNDER EACH WING TIP.
ACTUATOR SUPPORT ~ 1/8" PLYWOOD, DRILL MOUNTING HOLE PRIOR TO INSTALLING IN WING.
1/16" PLYWOOD - PATTERN FOR DIHEDRAL "BREAK" STIFFENER ~ FORWARD SIDE OF TRAILING EDGE.
F1 (FIREWALL) MAKE FROM 1/8" PLYWOOD. ~ NOTE BEVELED SIDES TO CONFORM WITH NOSE SHEETING.
1/16" x 1/4"
1/8" x 1/4"
1/16" PLYWOOD
F2 BULKHEAD ~ NOTE 1/8" DOWEL HOLES (WING ATTACH)
1/16" x 1/4"
1/8" x 1/4"
F3 BULKHEAD
1/8" HARD BALSA ADDED LATER ~ AFTER REAR WING SUPPORT TONGUE IS IN PLACE.
3/32" PLYWOOD
CUT OUT TO RECEIVE "DOUBLER"
PLATE 3. 12-69


℄
1/32" SHEET COVERING HERE (TOP SURFACE)
FALSE RIB
.045" M.W.
THE ENTIRE BOTTOM SURFACE OF THE CENTER SECTION IS COVERED WITH 1/32".
1/8" SCRAP
1/8" DOWELS (WING ATTACH)
1/8" SCRAP
THIS AREA OF BOTTOM SHEET COVERING IS REMOVED AFTER DUMMY "OIL COOLER" IS INSTALLED.
SCRAP BRACE
1/8" PLYWOOD ~ SEE PLATE 3 FOR PATTERN.
"INTERNAL" LANDING GEAR LOCK. 2 REQ'D. 1/16" PLYWOOD.
SKETCH OF MAIN GEAR INSTALLATION. ~ PLYWOOD SHOULD BE GROOVED TO ALLOW WIRE SLIGHT EXPOSURE SO LOCKING SCREW WILL BE EFFECTIVE.
#2 × 5/16" SHEET METAL SCREW & WASHER.
1/16" PLYWOOD ~ SEE PLATE 3 FOR PATTERN.
1/16" PLYWOOD ~ "BEVEL" TO FIT.
AILERON HORN 1/32" MUSIC WIRE.
NYLON OR BRASS TUBING ~ "GAUZE" TO STRUCTURE.
℄
1/16" PLYW'D. OR EQUIV.
1/8" × 3/16" HARD BALSA OR PINE.
DRILL HOLE FOR TIGHT FIT ON ACT. ARM & NOTCH.
1/32" NYLON OR EQUIV.
"CEMENT" HOLES.
SKETCH OF BELLCRANK ASSY. (NOT TO SCALE)
STABILIZER & ELEVATOR 1/16" SHEET BALSA (MED.)
ELEVATOR CONTROL HORN ~ 1/16" PLYWOOD.
SKETCH OF TYPICAL CONTROL HINGE INSTALLATION. KEEP CLOTH FREE OF DOPE, CEMENT, ETC. AT HINGE LINE TO PERMIT FREEDOM OF MOVEMENT.
"Mini Mono"
PLATE 4. 12-69

Let's ALL Race

Plastic Cosmic Wind has high performance and fast, unique construction.

GEORGE HILL AND CLIFF TELFORD

ONE of the many attention-getters at Toledo this winter was the Cosmic Wind Formula I racer by Lanier Industries. At first sight, it bore no resemblance to the standard Lanier types so familiar to everyone but, instead, looked like a conventional "built-up" model.

We decided to build this racer when the kit became available. Among the several compelling reasons was the minimum building time required to get into the air. Building time will vary with individual skills, but we put about 32 hours into the kit prototype. This time could be cut down when using the regular kit now available. We were slowed by a limited set of instructions and by working almost around the clock. More time can be saved by following the detailed set of "Heathkit" type instructions Lanier now includes with the Cosmic Wind.

Unique features of this kit include a hollow hard-skin wing and a crutch system for mounting the engine, tank, landing gear block, and servo tray. (Patents are pending on both of these new features.) Our early fears of vibration-associated problems attributed to mounting the engine on this crutch system proved unfounded. In fact, practicality and simplicity make it a plus feature.

Reservations about the wheel pants staying on proved well-founded. In our opinion, the landing gear is weak on our prototype Cosmic Wind kit. Improvements are being developed. In all fairness, we should mention that the kit we used had fairings on the gear struts, and that our landing technique could stand some improvement.

A Supertigre G-40 ABC engine was used, but any 40 should mount just as easily. The engine was mounted with 6-32 screws instead of sheet metal screws suggested. The engine in a racing airplane is removed many more times than in a pattern ship, and machine screws are more suitable for this purpose. As an extra precaution, each blind nut was held securely in place with one No. 4 sheet-metal screw. Steel plates, provided to use between the engine lugs and the plywood crutch, also are held in place with No. 4 sheet-metal screws.

The kit provides a sheet of .015" soft aluminum and a pattern to fashion a baffle which keeps the exhaust gases from contaminating the intake air. It also deflects the engine cooling air out of the right cheek cowl. In flight tests, this was found to serve its purpose, but we do recommend a more positive method to feed air to the engine intake. Adding an intake scoop below the engine compartment would be effective and would earn more scale appearance points.

Kit instructions include a good diagram for tank plumbing installation utilizing engine crankcase pressure. Three fittings must be made by soldering brass tubing to a mounting plate. The fittings are for the pressure line, fuel line, and an overflow. In our haste to finish the airplane and leave for a contest at 1 a.m., we skipped the recommended installation and devised one of our own in about ten minutes. The photographs reveal that neater installations than ours are possible.

Since most modelers will probably devise their own plumbing systems, detailed instructions are not necessary. Several recommendations, however, must be made. (1) Don't use the high-pressure timed air bleed off the engine. Use an ordinary low-pressure bleed from the upper left rear cover screw on the engine crankcase. (2) Keep the number of lines and connections to a minimum to avoid leaks.

A few words of caution in construction: wash your hands thoroughly before touching the plastic parts. Nothing sticks well once any oil or grease has come in contact with the plastic. By all means follow the complete instructions included in the kit. Use Air-o-Cement sparingly — a little bit really goes a long way. It also makes a good bond for attaching the canopy. Be sure to make a small pin hole in the cockpit area. Otherwise, the canopy probably will collapse the first time the racer sits in the sun for any length of time. This results from temperature and pressure changes inside the canopy.

The finished wing must be seen to be appreciated. The new hard skin is great; the tips go on well — polypropolene hinges are already in place in the wing sections. Joining the hollow wing halves is done with six 1/16" ply joiners and plenty of epoxy. We used quick-set epoxy throughout to allow faster building. Trouble was encountered in fitting the spar joiners properly. This proved to be the single most time-consuming task in constructing the model.

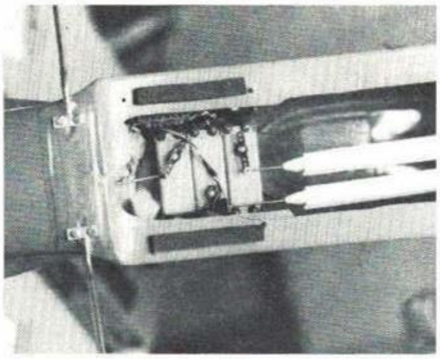
As a suggestion for joining the wings, balsa plugs may be made for front and rear of the wing. Construct these to airfoil shape (inside dimension) from ½" soft stock. Preglue the alignment keys in one wing half prior to final assembly of the wings. The main point to be stressed in getting a proper joining of the wing halves is to take time to do the pre-fitting work properly.

The tail assembly is straightforward: stabilizer and fin are pre-hinged, rudder and elevator are pre-covered. The plans call for a 1½" elevator horn, but we suggest you shorten it to 1¼". We barely had adequate elevator travel.

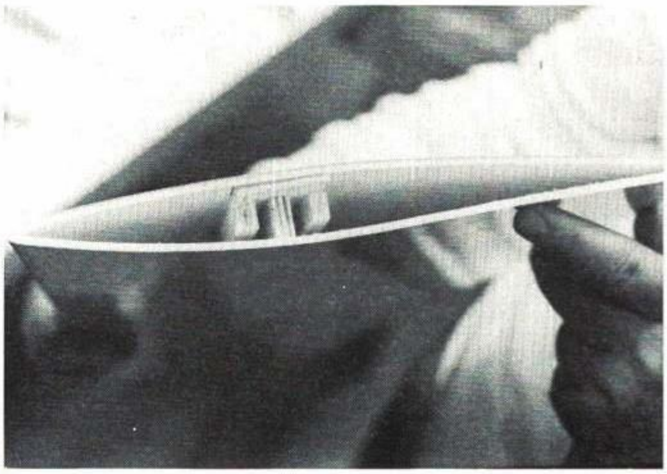
Note the new temperature-compensating pushrods. They are fully field-tested and they work. These new pushrods were not included in the kit but are available separately from Lanier.

Initial test flights with this new racer proved it to be quite competitive. Times around the 1:50 mark were recorded, when 20% nitro fuel and a 9 x 8 Top Flite pylon-racing prop were used. With more experimentation and practice, even better times can be expected. One word of caution on the landing technique. Use a long, flat approach and bleed off the airspeed fairly close to the ground or elevator travel may run out at too high an altitude. Shortening the elevator horn, as previously mentioned, may help to alleviate this problem. We also believe that a landing gear constructed of .090" dural would be more serviceable than the $^5/_{32}$" wire gear supplied with the kit. This type of gear also would have less drag and should earn more scale points. In addition, the dural gear would provide a better means for attaching the wheel pants.

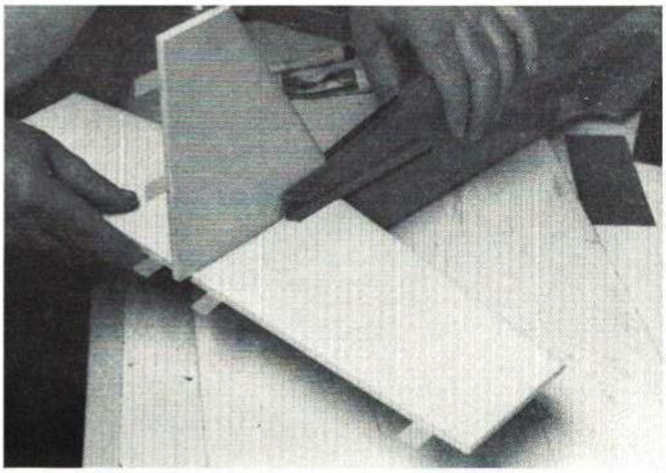
After 15 flights, the airplane proved to have no structural problems other than the wheel pants cracking as a result of hard landings. This kit should be a welcome addition to the Lanier line. For anyone who hasn't tried Formula I racing, it is a quick way to get into competition. The Cosmic Wind also will make an excellent back-up aircraft for those already in the racing game who want to spend more time flying.



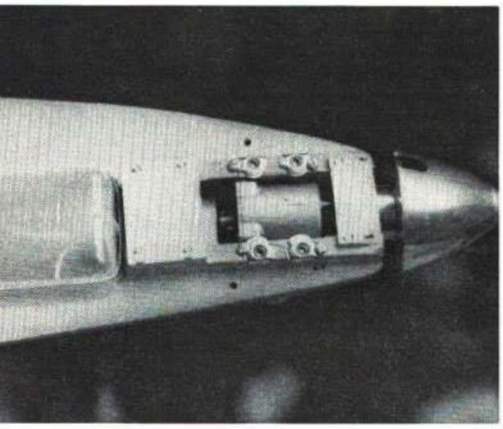
Plastic pushrods eliminate temperature-related trim changes. Servos well forward.



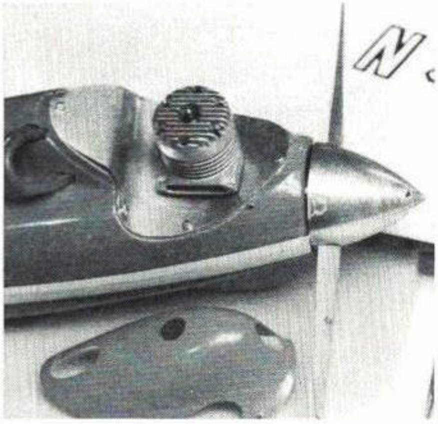
One of the patented features of the model is the hard skin and foam wing material. Foil is symmetrical at center and flat with tip washout. Strength and dihedral provided by built-up spar.

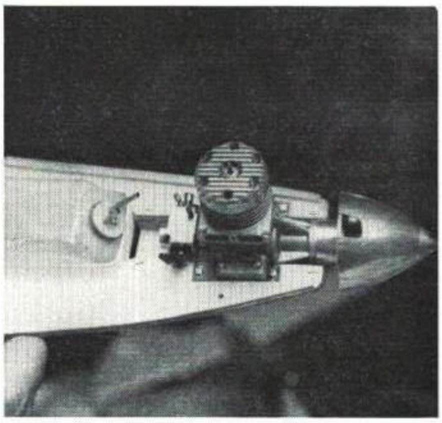


Rudder is assembled with stabilizer halves, using epoxy. These parts are like wing skin and foam, but folded flat and glued with flexible plastic hinges epoxied at the trailing edge.

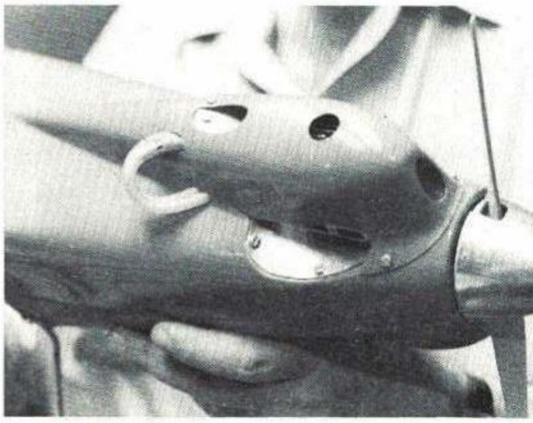


Left: Engine is mounted to a preassembled crutch unit. A slant-front Sullivan tank is specified as shown. While author used 6-32 bolts and big steel blind nuts, kit recommends sheet metal screws. After fitting, the crutch is well fuel-proofed with epoxy.





Right: Fuselage nose is completed by shaping a sheet of aluminum to seal off the engine above the crankcase. Patterns and aluminum are in the kit. Removable cowl should be fiberglassed inside for heat protection. No exhaust extension needed.



F/F BOB MEUSER
General Correspondent
SPORT

Old-Timers in Miniature: Old-Timers are on the march in Southern California with 17 contests scheduled in 1970. A recent twist is 02-powered scaled-down versions of the pre-1942 gassies. On hand at the kick-off contest of the Southern California Antique Model Plane Society were 15 of the little jewels. Sal Taibi says, "One thing that appeals to me is that I can build one in a weekend."

One of the hottest of the minis, with a first and a second place in its first two contests, is Robert Oslan's version of Bill Englehardt's 1940 Nats winner, So-Long. Sal estimates its rate of climb at 1200 ft. per min., and Gene Wallock, president of the SCAMPS calls it "one of the best flying machines I've seen, regardless of size."

The main restrictions are that the outlines must be to scale, and the major construction features must be retained. Upon the addition of a one-ounce dummy pilot, Bob's So-Long would qualify under the Payload Gas rules, and the extra ounce probably wouldn't hurt the performance much. John Pond has plans of all the Old-Timers. Send him 25 cents for a 13-page list; 4135 Avati Dr., San Diego, Calif. 92117. . . .

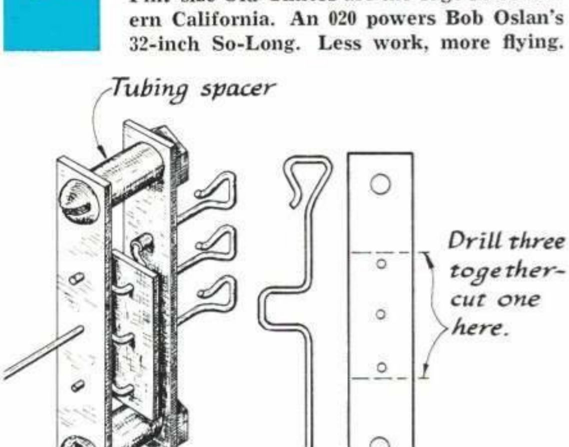
NFFS Symposium Report: Report editor George Xenakis, thermal-detector-toting member of both the Wakefield and Nordic teams at the 1969 World Championships, has lined up a fine collection of papers, covering such subjects as airfoils and sinking speed, Wakefield and power props, wing stiffness, wind effects, stability, and indoor models. Copies are available at the Nats, or send $3.50 if an NFFS and AMA member, $4.50 if not, to Annie Gieskieng, 1333 South Franklin St., Denver, Colo. 80210, or write for price on package deal including previous reports. I am symposium report editor for 1971, so anyone interested in submitting a paper, or knowing of someone who should, write to me c/o AAM. . . .

Custom Carved Props: It seems hard to believe, in this automated computerized age of instant everything, that you can have a prop carved to your own specifications for prices starting at $1.50, but it's true! They come balanced, finished, rubbed, waxed, and packed in a felt bag; in diameters up to 20 in.; laminated or solid; left- or right-handed; and in many styles, including Vintage. True scale props cost a bit more. Robert Lewis, now a 31-year-old high school woodshop instructor, has been carving props by the basketful since he was 12.

Continued on page 81

Pint-size Old-Timers are the rage in Southern California. An 020 powers Bob Oslan's 32-inch So-Long. Less work, more flying.

Left, an altered Schoolmaster, Bug Smasher on right. Sport free flight isn't dead. Reid Libby likes it. Realistic flights on 020's.



Gearless Transmission

F/F WALT MOONEY
Specialist Correspondent
SCALE

Orbiteers' Free Flight Contest: It was April in San Diego, but the weather was more like August for the Orbiteers' monthly scale free flight contest. Although intended as a fun-type club contest, word got around and entrants arrived from Escondido, Fallbrook, and Los Angeles. There were sixteen models in Rubber scale, and four in Gas scale. Six of the rubber entries were Peanut scale models.

The great god of the thermals, "Hung," was really in action and as a consequence the competition was really hot. Howard Haupt finally made the best rubber flight of the day with his Pilatus Porter — 111 sec. Fudo Takagi had a best flight of 105 sec., and Walt Mooney managed a paltry 70 sec. In gas, Gene Bach flew for 226 sec. on a 63-sec. motor run to capture the highest flight ratio. Early in the day a semi-scale model with the propeller dangling on the end of a long motor and diving at a 45-degree angle was seen (or unseen, perhaps?), to disappear straight up overhead in the company of a red-tailed hawk. Then the hawk disappeared too. There were a total of 45 recorded flights.

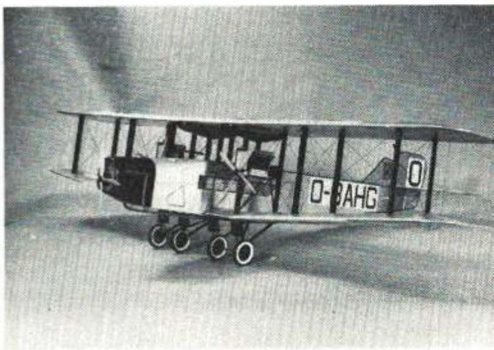
Probably the most interesting model of the meet was a rubber-powered Curtiss SO3C in Navy colors, entered by Bill Pardoe of Los Angeles. Best flight of the SO3C was 39 sec. which netted seventh place. Fun and Thermals was the name of the game but the winners did take home a portion of the entry fees collected. . . .

News and Notes: Captain Dave Stott of the Connecticut Flying Aces sent a picture of his latest Peanut Scale, a Handley Page W8-F ten-passenger trimotor. This is a really ambitious project for such a small model.

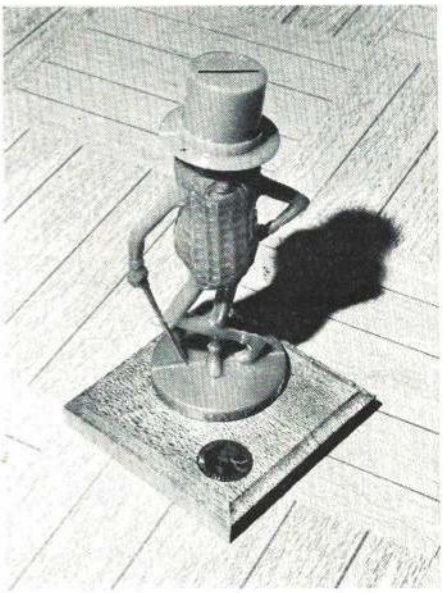
Fudo Takagi, besides being a scale flier and avid disciple of "Hung," is an excellent photographer and a creator of interesting trophies. His latest creation is a Peanut Scale trophy made by using a Planters Peanut bank. Kenny Hannan won one of them at the last indoor Peanut contest and left his father, Bill Hannan, slightly envious. Some of the rest of us were a little green too.

North American Rockwell Flightmasters have scheduled their annual contest for October 3 and 4. They say, "If you have a scale model, we have an event for it." They mean it, too. For information contact J. O. Bailey, 11161 Mansel Ave., Inglewood, Calif. 90304. They also have a Jumbo Scale Annual (Rubber power, over 48" span only) scheduled for December 13, 1970.

The word is that Bill Warner is flying a Peanut Scale model indoors with a Brown Junior CO_2 motor for power. Except for the initial cost, this is economical flying at its best. Clean, quiet, and the engine always starts on the first flip.

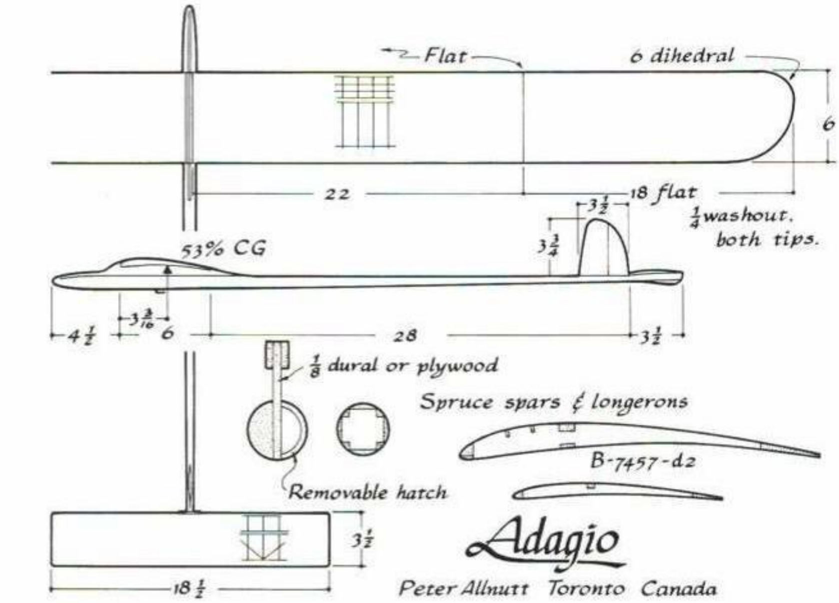


Dave Scott's Handley Page W8-F is well-detailed Peanut scale job. Long fuselage carries lots of rubber. Dummy outer props.



What could be more apropriate trophy for Peanut scale event? Planters Peanut Man is dandy prize. Would wings make him fly?

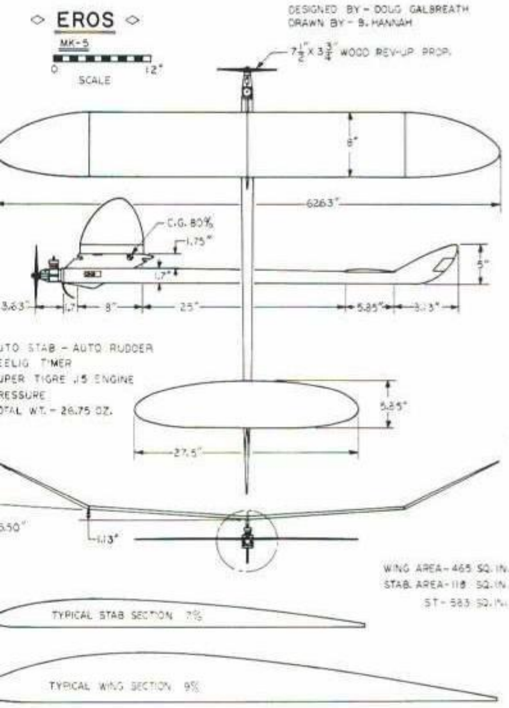
Don Yearout gives his original high-thrust ½A job the extra altitude of a mighty heave.



This Canadian model has many contest wins to its credit. According to Peter Allnutt, it is practice, trimming and proper towing adjustments that bring the victories.

F/F CHUCK BROADHURST
Specialist Correspondent
POWER

Fly for Money: It's official! Sunday, July 26, is the date for the Detroit Balsa Bugs all-FAI "Gathering of Eagles" at Bong Field, Wisconsin. The Bugs are hoping for a respectable number of entries in Power, Wake and Nordic at $25 each. They just may do well, since a lot of fliers will be headed for the Glenview, Ill., Nats, which commence the following day. If 25 fliers enter Power, for example, first place gets $265, second place $185, and third, $79. . . .



Eros is continuously being developed by Doug Galbreath. This, the fifth version, emphasized speedy climb and faster airfoils.

New Club Formed: A big welcome aboard to the Antique Model Plane Society of Northern California. Formed early this year to promote Old Timer and Antique events, this club already boasts 26 members and a newsletter. President of the group is Cliff Silva; veep, Spirow Nickolaw; and the secretary-treasurer-editor, Paul Tull. Write Paul, c/o 2243 Linden St., Livermore, Calif. 94550. The AMPS are making plans for a fly-in every month! . . .

Experimental Power Event: FF Contest Board chairman, Joe Boyle, Jr., writes that the two recent proposals to restore tuned

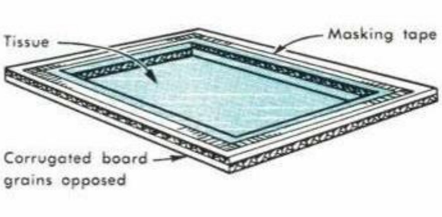
Continued on page 81

F/F BUD TENNY
Specialist Correspondent
INDOOR

Needed — Indoor Flying Sites: Indoor novices need both coaching and practice to become proficient with indoor models. Lists of coaches from all over the country are now available, but what about places to practice? A flying site, or lack of one, is the problem most often mentioned in queries about indoor flying. Unfortunately, everyone envi-

Continued on page 79

Water shrink first, then apply one coat of dope 60 40 mixture (40% dope 60% thinner). Used on Easy "B"



METHOD FOR PRE-SHRINKING AND DOPING TISSUE FOR LIGHT WEIGHT MODELS
BY: GUSTAVE NEPPER

F/F BOB STALICK
Specialist Correspondent
GLIDER and RUBBER

Allnutt's Towliner: The most distinguishing features of Peter Allnutt's Adagio A/2 are the turbo-encabulator wingtips, V-tail, machined aluminum nose, and trick airfoil — which it doesn't have! This super-simple, clean model has racked up an impressive list of firsts both on its home ground, Canada, and in the U. S., including the 1969 Nats and the 1968 King Orange Internats. "Nothing unusual, just a dependable thermal catcher," says Peter. Who needs more?

Peter passes along the following recipe for instant success: "Use epoxy on all joints including the stab — no shrink, no warp. With the CG in the proper position, and the stab incidence adjusted by hand gliding, adjust the towing position of the rudder for a straight tow. If a straight rudder gives a straight tow it indicates there are no warps, and the model may be made to turn in either direction in the glide. If right rudder is required for towing, the rudder must be set

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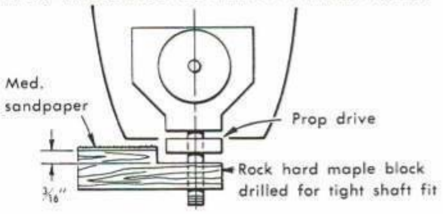
What a Korda! Yes, in Coupe d'Hiver size, it won Dick Black trophy at recent meet. Modeled by Judd Suba. High-time flyer.

R/C DON LOWE
General Correspondent
SPORT and PATTERN

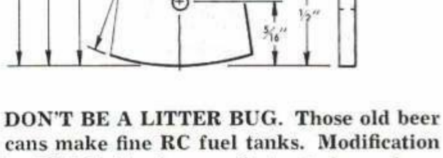
Newsletters and Product Appraisal: One of the best sources of information and ideas for this hobby is club newsletters. Most RC clubs of any size now publish newsletters and many of them reveal considerable talent and taste in content and construction. A list of some 150 newsletters in this country and abroad was compiled by Jerry Kleinberg and graciously shared with me; I am sure there must be more. These newsletters serve more than the local group, since most are mailed to other clubs. Articles and ideas are thereby exchanged, and newsletters have helped to greatly improve communications among RC modelers.

Since these newsletters are not industry-sponsored, they owe allegiance to no one but their clubs and to modelers in general. Therefore, considerable freedom of expression is present. An area that is creating some concern is the product appraisal that appears from time to time. Usually these are no-holds-barred, straight-from-the-shoulder appraisals by individuals who may have had a bad experience with equipment, service, etc. Some feel this kind of expression is bad because it represents an isolated case and does a disservice to a manufacturer who, on the whole, produces quality merchandise and provides good service. Others say this kind of expression is needed, since it is the only honest appraisal of equipment that a modeler can count on.

DICK WANGLER'S COWLING SPINNER FITTER



Screw block onto shaft until contact with airplane is made, then rotate back and forth sanding front of cowling until seated on engine prop drive. Face cowling with 1/16" ply



DON'T BE A LITTER BUG. Those old beer cans make fine RC fuel tanks. Modification by Phil Gabler is easy: Cut out above shape from brass sheet, solder tubes, mount with screws. If needed, add rubber gasket.

I believe that fair product appraisal can be obtained only through sampling a cross section of experiences with a product. Even then care must be exercised to insure that operating conditions are similar and personal neglect or deficiency is not involved. I'm sure that some products have been condemned because individuals failed to use the item properly and within its limitations. I've done this and I'm sure most of you can cite similar experience.

By the same token, there may be products on the market that shouldn't be there, and how is a guy going to know what to buy, since typical advertising tells him nothing? Perhaps what we need is an independent product appraisal organization for RC equipment. What do *you* think? . . .

Club Pylon Racing Criteria: Many clubs are cranking up pylon racing through the use of a single airplane design of modest

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R/C BOB MORSE
Specialist Correspondent
PYLON RACING

No-Expert Weekend: The Whittier Narrows group in Southern California staged its "No Experts" weekend in mid-March. Only those fliers who have not accumulated the necessary point totals to become NMRPA exhibition pilots were allowed to race. This is a new twist for getting the reluctant fliers into the action. John Garabidian and his crew are to be commended for this one. . . .

Callers Are Important: Newcomers to the racing scene usually are worried about how to "hop-up" engines, how to trim props, what fuel to use and so on. All these things are fine, of course, and contribute to eventual success. However, we feel that one of the most important, and often neglected, factors contributing to crossing the finish line first is the caller. At times he can make it or break it.

The last thing a caller should do is watch the airplane. His job is to watch the flagmen. First, he'll call the turn at the scatter pylon, and then hang in there to make sure the pilot didn't cut. He can do this and still pick up the No. 2 and No. 3 pylon flagmen, watch them for cuts for an instant, and then break back to the scatter pylon again. If the flier does cut, his caller will keep him

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R/C GEORGE SIPOSS
Specialist Correspondent
R/C CAR RACING

Racing Schedules: Racing has never been better and many formal race schedules have been set up. In the Midwest, Series 70 will be held in various locations in the Chicago, St. Louis, Milwaukee, Indianapolis quadrangle. For more information write (enclosing a self-addressed stamped envelope) David Palmeter, 5728 Fontana Dr., Ft. Wayne, Ind. 46805; Dan Powers, P. O. Box 297, Westfield, Ind. 46074; Bill Campbell, Box 754, Bridgeton, Mo. 63042; or Larry Hilmoe, 9419 Caddy Lane, Caledonia, Wisc. 53108.

For Eastern Schedules, write Robert Valyou, 42 High St., No. Billerica, Mass. 01862.

West Coast action is centered around Garden Grove where Bob Blair's Orange County R/C Car Club holds races on the first Sunday of every month. Write to Bob at 5572 Stanford, Garden Grove, Calif. 92461. . . .

Buying Parts: Parts are becoming easier to find. If you cannot find what's needed in a nearby hobby shop, ask the proprietor to order it (Some businessmen still don't be-

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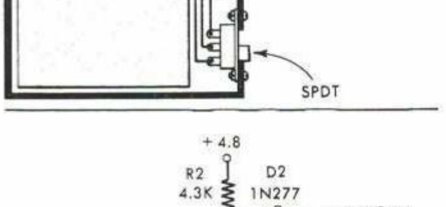
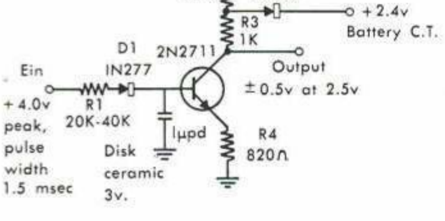
R/C FRED MARKS
Specialist Correspondent
TECHNICAL ITEMS AERODYNAMICS

Avoid Needless Engine Flipping: F. Perlman uses the arrangement shown to check for proper glow plug operation. A surplus nickel cadmium cell, a 3V bulb and a single-pole, double-throw switch mount handily in a 2¾ x 3½ x 1" plastic box. This also protects the battery from inadvertent shorting and keeps dirt away.

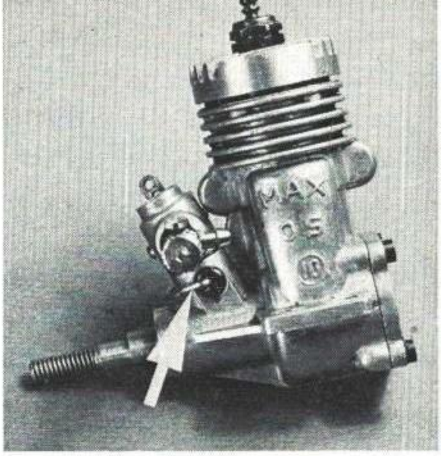
A built-in fuel filter and clunk is obtainable from the local oil burner service, in some cases at no cost. Domestic oil burners have, on the bottom of the injection nozzle, a filter and guide which are often thrown away when a furnace is serviced. Close the opening sufficiently to permit a short length of brass tubing to be soldered to it and, in turn, attached to the fuel line in the tank. The strainer is removable for cleaning. . . .

Digital to Analog Converter: Frank Kirby uses the circuit shown to permit use of analog servos for auxiliary functions. According to Frank, "Here is a circuit that will make analog servos usable with Kraft and Heathkit decoders and with other brands if adjustments are made to the circuit. The circuit as designed was used with Orbit analog servos which require a ±0.5V signal averaged around +2.5V.

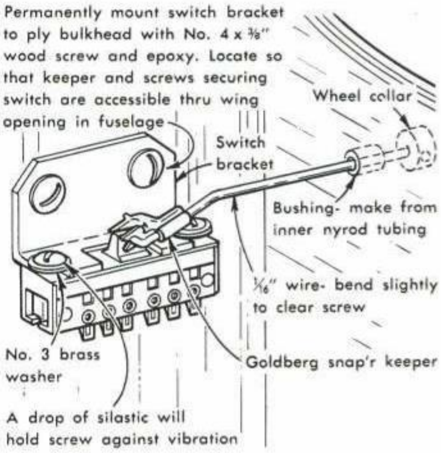

18" leads to alligator clips
1.5v light, glue in case
−
+
1.2 AH NiCad battery, mount to plastic case by terminal bolts
SPDT



PULSE TO ANALOG CONVERTER
BY: F. KIRBY



Music wire bent to U shape around venturi area and into center of Phillips head screws which mount RC carb, prevent loss.


Permanently mount switch bracket to ply bulkhead with No. 4 x 3/8" wood screw and epoxy. Locate so that keeper and screws securing switch are accessible thru wing opening in fuselage
Wheel collar
Switch bracket
Bushing- make from inner nyrod tubing
1/16" wire- bend slightly to clear screw
No. 3 brass washer
Goldberg snap'r keeper
A drop of silastic will hold screw against vibration

Aluminum slide-switch mount from Tri-Valley newsletter. Note thinned and drilled switch handle. Silastic resists corrosion.

"This circuit should not be used on the control surfaces as there is some drift due to variation of the input pulse amplitude with changing battery voltage. Circuit function is as follows: the incoming digital pulses pass diode D1 to charge the capacitor. The capacitor discharges through the transistor (which keeps the transistor on for the duration of sufficient current flow). Capacitor voltage level reaches a nominal level after the first few pulses, then its voltage level varies slightly with pulse width (±0.5 millisecond variation). The transistor amplifies the output voltage to about 2.5V with the required ±0.5V variation at output corresponding to input pulse width variation. Diode D2 is a changing diode to prevent the servo from overrunning when the pulses are removed.

"For greater output variation, add more diodes in series with D2 or use a silicon diode (e.g., a 1N4009) in place of the D2 shown. The nominal output voltage at neutral may be adjusted by varying R1 within the limits of 20K to 40K ohms. Increasing R1 increases nominal output voltage."

This circuit is essentially an integrator to convert the pulses to an analog control voltage. By inserting a Zener diode for clipping the amplitude of the digital pulses, the drift due to amplitude change with battery volt-

Continued on page 82

R/C HOWARD McENTEE

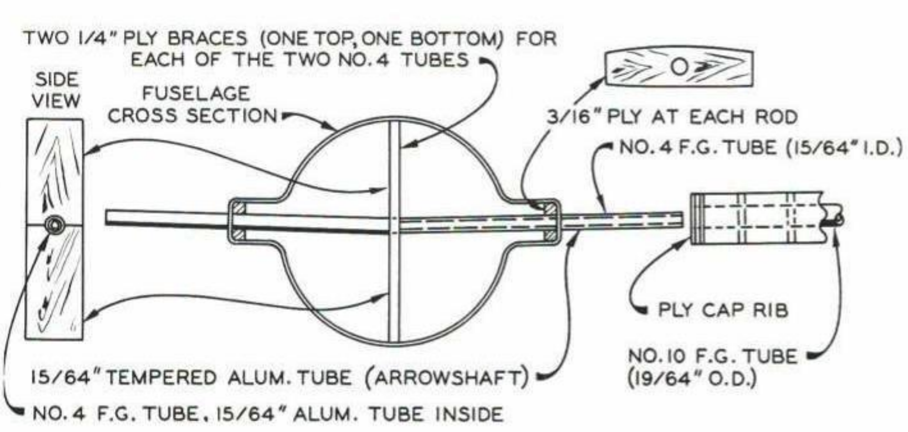
Specialist Correspondent
GLIDERS and FAI

Fiberglass Tube Wing Supports: Having wrecked the tongue-and-box system attached wings on his big Miskeet glider, Harley Michaelis tried fiberglass tubes. They held but proved too flexible. A new Miskeet also was fitted with these tubes; however, they have inner reinforcement (see sketch). No. 10 tubes also are used in the wings as spars and terminate at ply cap ribs. No. 4 tubes are supported at fuselage center with vertical braces of 1/4" ply. Fuselage tubes are beefed-up with inner dural arrow shafting, epoxied in position. The No. 4 tubing is a close sliding fit inside No. 10's. Trials of this setup without the center 1/4" braces showed too much flexibility, although overall strength appeared adequate.

Tubes in fuselage can be straight across, rather than angled at the center. In such cases the holes for tubes in wing ribs must be drilled at different heights from bottom

Continued on page 83

Harley Michaelis launches soaring glider from his exclusive, magnificent slope-lift site. Also has excellent landing area.


TWO 1/4" PLY BRACES (ONE TOP, ONE BOTTOM) FOR EACH OF THE TWO NO. 4 TUBES
SIDE VIEW
FUSELAGE CROSS SECTION
3/16" PLY AT EACH ROD
NO. 4 F.G. TUBE (15/64" I.D.)
PLY CAP RIB
NO. 10 F.G. TUBE (19/64" O.D.)
15/64" TEMPERED ALUM. TUBE (ARROWSHAFT)
NO. 4 F.G. TUBE, 15/64" ALUM. TUBE INSIDE

CLAUDE McCULLOUGH

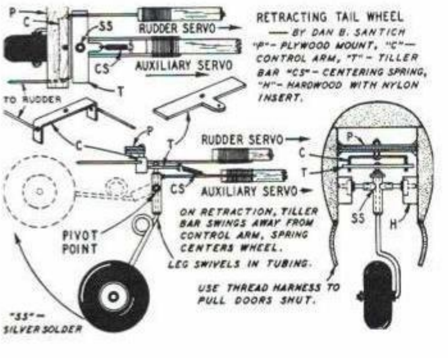
Specialist Correspondent
SCALE

Jenny One More Time: Walt Moucha's big, beautiful Curtiss JN-4 was shot down during the demonstration flying at the Toledo show. Damage was so bad he has given up on repairs, is building a new one with more scale features than the original effort, as well as authentic structure, wing section, and more detailing. Scale of 2½ in. to the foot gives a 109-in. span. For another airplane Walt needed unavailable 5-in. balloon-type wheels. He found that by over-inflating a standard Veco 4½-in. he could reach the required size and shape. This technique should work on other pneumatic sizes. . . .

Custom Carver: Robert Lewis (617 N. State, Big Rapids, Mich. 49307) offers a unique hand-made propeller service, including special orders and pushers. Of particular in-

Continued on page 84

Seems twins are the "In" thing in RC scale. In every case, single-engine performance of real plane is duplicated by the models. Here Robin Lehman's Twin Porter on skis in Swiss markings shows off its squarish lines. Has real STOL capability.


P
C
SS
RUDDER SERVO
CS
AUXILIARY SERVO
T
TO RUDDER
RETRACTING TAIL WHEEL
— BY DAN B. SANTICH
"P"- PLYWOOD MOUNT, "C"- CONTROL ARM, "T"- TILLER BAR "CS"- CENTERING SPRING, "H"- HARDWOOD WITH NYLON INSERT.
RUDDER SERVO
AUXILIARY SERVO
PIVOT POINT
ON RETRACTION, TILLER BAR SWINGS AWAY FROM CONTROL ARM, SPRING CENTERS WHEEL.
LEG SWIVELS IN TUBING.
USE THREAD HARNESS TO PULL DOORS SHUT.
"SS"— SILVER SOLDER
H

C/L BILL BOSS

General Correspondent

SPORT and SCALE

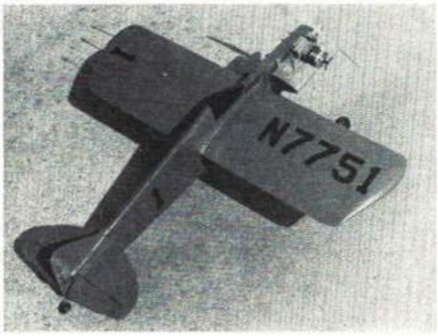
Bellcrank and Leadout Locations: Many letters from youngsters just starting out with control line flying ask where to place the bellcrank and leadout guides. The bellcrank should be solidly mounted in the fuselage, usually on a plywood platform as close as possible to the centerline of the fuselage and at the center of gravity (balance point) of the plane. This point is usually found at or near the midpoint of the wing chord. On very simple all-balsa models and on some profile jobs, the bellcrank is often located on the wing top or bottom surface. There it just sticks out in the breeze. Instead, it should be positioned near the fuselage and center of wing chord.

The leadouts pose a little more of a problem. Three basic methods are used, each depending on the type of plane being constructed. The sketch illustrates these basic leadout mountings.

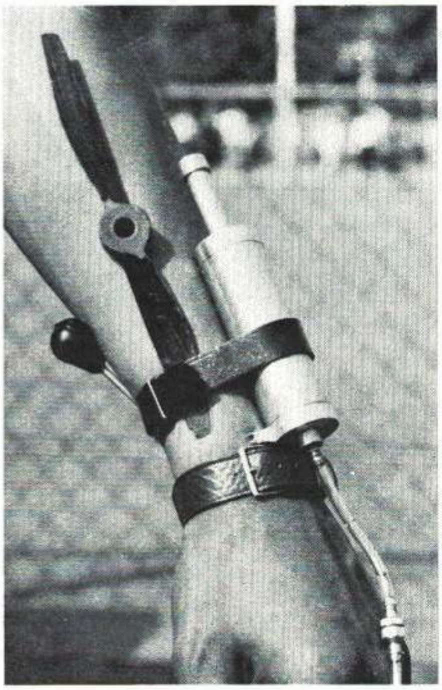
The mid-wing plane presents few problems since the bellcrank and leadouts are installed in the center of the wing, with the leadouts threaded through the wing ribs and wing tip. On the high-wing and low-wing planes the situation is a little different. With the bellcrank mounted on the centerline of the fuselage, a guide must be provided for the leadouts to keep the control system in a straight line.

On the high- and low-wing planes the leadout guide can be made of plywood and should be mounted (glued) firmly to the wing tip or a rib close to the wing tip. The size and shape of the leadout guide will de-

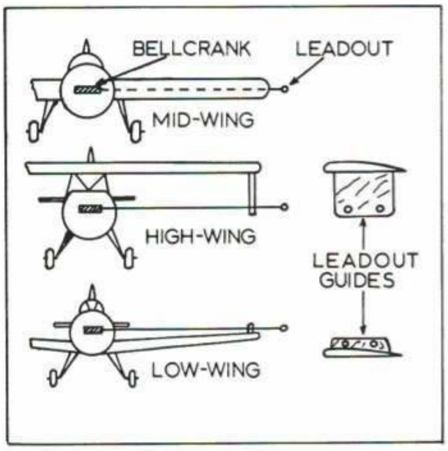
Continued on page 78

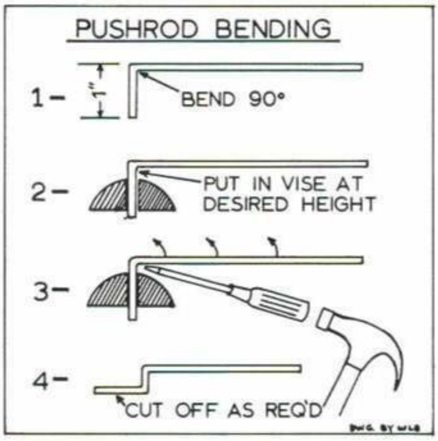


Ray Leone built this diesel-engine Bonzo from Cal Smith plans in July 1961 AM. He reports Webra II 15 is easy starting with 8/6 prop. Compression and needle setting not critical. No plug to burn out.



At a recent World Championships, Russian pit man was well-armed. Pressure fuel system, wrench, and spare prop. Team race heats are often won in pits. Takes practice.





Sharp Z bends in 1/16" music wire often result in broken and off-round wire at the bellcrank bearing. Try this, it works.

These juniors, Sal and Phil Castelli, have some mighty good-looking models. Berkeley Guardian, Top Flite Hurricane, Sterling F94C with throttle, and an old Consolidated Fancy Pants. Once one has learned to fly safely, it is fun to make them beautiful.

C/L JOHN SMITH

Specialist Correspondent

SPEED and RACING

Juniors Need Help: Youngsters starting to fly speed are looking for help with many of the problems that are old hat to the regulars — things like dolly design, prop selection, installing a good control system. Spend a few hours with these young fliers. They are the experts of tomorrow. . . .

½-A Proto At The Nats: Check the Nats registration pertaining to ½-A Proto Jr. Entrants in Profile cannot fly "enclosed" Proto. A choice must be made. This has been the rule at other contests. Fliers who disagree should voice their opinions to their district AMA VP's. . . .

New Proto Speed Parts: Dale Kirn will be marketing a plastic fuselage shell for the Cox magnesium pan. It's very light and in colors. He also will have left-hand props and control systems available. I will have fiberglass proto (B) shells ready soon. These will be complete fuselages with metal engine/landing gear mounts included. . . .

Epoxies, Good and Bad: New quick-set epoxies should be avoided for all except field repairs. Then they should be used only in areas of low stress. The cement sets before it penetrates the pores of the wood and doesn't give a good bond. In many places white glue works just as well and makes a stronger joint. . . .

Nats Time Upon Us: The NATS, that first car, Christmas — all are milestones. But the Nats' memories linger longest. Why do we go? Most fliers agree that the airplanes are the excuse, not the reason, they are there.

Flown for fun at dusk during '65 World Championships, homemade all-metal pulse-jet speed plane. By Franco Marcenaro, Italy.

It's the bull sessions at night, the hangar flying, the reliving old memories of past Nats, that count. So do getting to know a guy, to learn his likes and dislikes, to hear about his family and his job. Maybe the guys at the Paris Peace Talks should be model builders. We'd have all the world problems solved in one night. . . .

Goodyear Racing Model Drawings: Check old *Air Trails* and *Air Progress* magazines for early Goodyear designs. Many issues had three-views that can be used for beautiful models. Color trim lines are shown, along with plenty of details. How about events for the Unlimiteds, Corsairs, 51's, Bearcats, etc? . . .

Jet Event Combined at Nats: All age categories of Jet Speed will be combined at the Nats this year, for lack of jet fliers. Not much equipment is available for this event, and those who do go fast keep the secrets to themselves. The main problem seems to be getting these ships off the ground. There were some beautiful designs last year, but always by the same gang. Some trophies went begging. Many more official flights would have been made if some tanks had been one lap larger. . . .

Ban The Pipe For CL Speed?: Now that the pipe has been banned in FAI FF, Speed fliers seem to be next. Let's hope not. With the many manufacturers testing it and making it work, it seems a shame to throw all this work down the drain. The way things are going we may be back flying Hornets in Speed-Wagons. If we do, probably the same fliers will still be winning. Perhaps

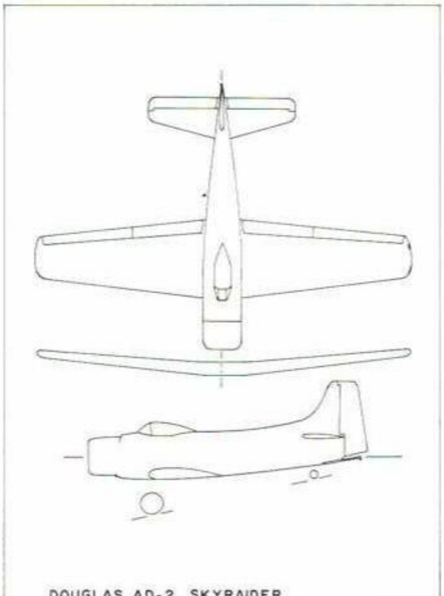
Continued on page 78

Jim Rhoades won Phoenix ½A Proto with 81 mph flight using Mono-line and a left-hand prop. LH crankshaft from Cox.

C/L JOHN BLUM

Specialist Correspondent
CARRIER and STUNT

Three-View: The first Nats win in Carrier was by Cal Smith using a model which represents good proportions for such a ship. References: Profile Publications Booklet No. 60; 1965 AM Annual; and January 1969 AAM. . . .

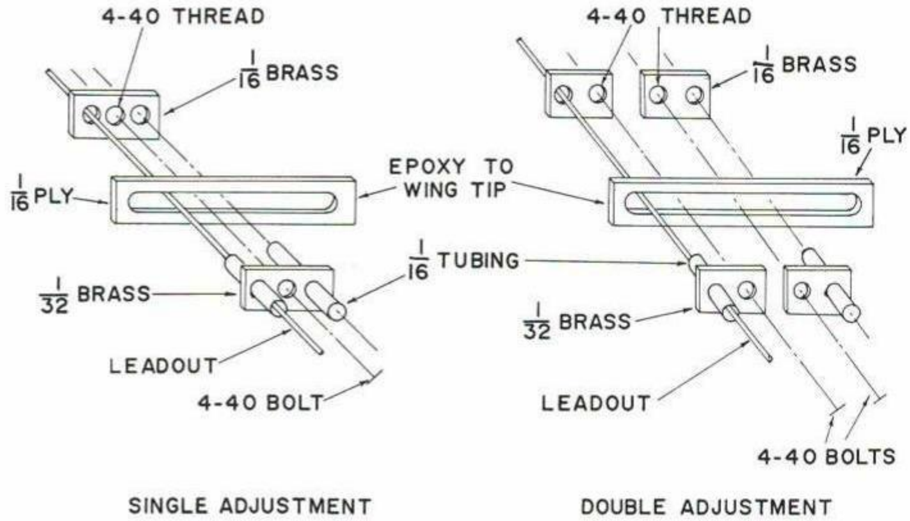


DOUGLAS AD-2 SKYRAIDER

Adjustable Leadout Guides: Bill Noyes makes two suggestions for adjustable leadout guides. The slotted 1/16" plywood plate is fastened to the wingtip permanently to facilitate the adjustment plates. Variations are possible, but these represent typical setups.

Either method permits a change in the rake of the wing control leadouts (the angle of the leadouts with respect to the longitudinal centerline of the fuselage). This enables a modeler to adjust for varying wind conditions and provides a means of finer trim and adjustment.

Stunt models, which operate at varying speeds throughout the pattern, are most adaptable. . . .



IDEAS FOR ADJUSTABLE LEADOUT GUIDES
BY BILL NOYES

And From England: Stephen Blake, a member of the Great Britain Stunt Team at the 1968 Helsinki FAI Internats, has qualified for the 1970 FAI Team. His letter reports that Stunt and Navy Carrier do not enjoy a large following at the competition level, however, many stunt models are built for sport.

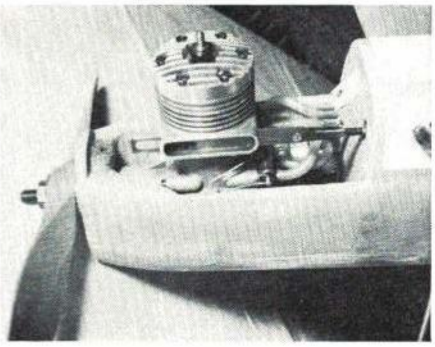
Navy Carrier was introduced to Britain at its 1968 Nats by use of a deck built by the Navy for the SMAE (Society of Model Aeronautical Engineers). Despite enthusiastic publicity by the English model press, Carrier has not caught on. Blake feels that the immobility of the deck between contests and the lack in mastery of wind conditions have slowed event popularity. Stunt has a stable following, but competition flying decreases slightly each year. The same seems to be true in the U. S. . . .

Gluing Balsa Sheets: The *Dawn Patrol*, newsletter of the Lexington Model Airplane Club, offers a handy hint for gluing sheet balsa planks together to facilitate planking a large surface. Sheets are first laid side by side to check alignment of the matched gluing edges and then they are connected by short pieces of masking tape. The attached balsa sheets are then turned over, permitting the joints to open and receive a bead of glue. The assembly is then placed on a flat surface with the taped side up to dry. This produces a large sheet of balsa for easier covering. . . .

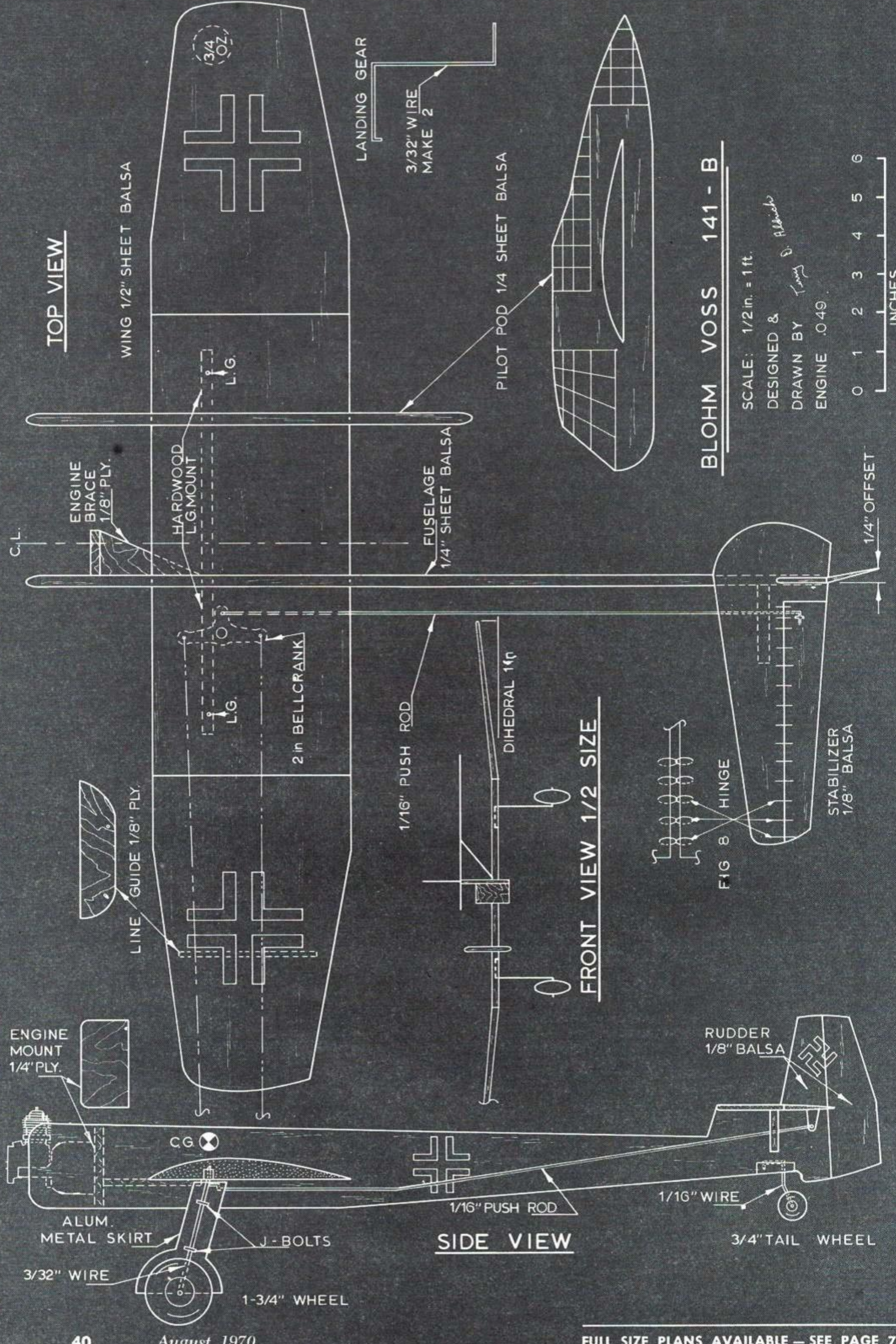
Navy Carrier Pull-Test: Those still questioning the recent AMA rules changes on the control line pull-test should refer to an article in the July-August 1966 *AM*. Bill Netzeband presents a nomograph to calcu-

Continued on page 78

Winner '69 Nats was Ed Gross with K&B-powered Curtiss Seagull in Navy Carrier event. In this event an ordinary RC engine won't do; racing fuels and props are used.



To control this hopped-up engine which must idle reliably, pressure cutoff, exhaust baffle, and intake throttle are interconnected. Lots of plumbing behind engine.



FULL SIZE PLANS AVAILABLE — SEE PAGE 70

By the author

Blohm Voss 141-B

Fine-flying asymmetrical German fighter makes great 049-powered trainer and sport model.

TERRY ALDRICH

OUT of WW II came a great variety of experimental aircraft. The BV 141B represents what was obviously one of Germany's farther out excursions into new design. The brainchild of Dr. Vogt, the asymmetrical aircraft went beyond the experimental stages and actually saw combat service on the Russian front.

Built in 1938, this fighter-bomber carried light armament by today's standards. Two fixed machine guns were supplemented by two movable, crew-manned machine guns, bomb load was four 110-lb. bombs. The crew pod carried four men including the pilot, while the main fuselage contained the 1600-hp BMW 801 engine. Statistics, converted from metric dimensions, were: wingspan, 57.3 ft.; length, 45.8 ft.; speed, 241 mph at an altitude of 11,500 ft.

The semi-scale 049-powered model is of simple balsa construction. The scale chosen resulted in a fairly large, stable, easy-to-fly model. One of the new McCoy 049's with the tank-mount combination was used, but any engine of similar displacement and mounting is suitable.

Epoxy resin (you can use your favorite cement or glue) was used to join all assemblies for durability. There are few joints. Make them all close-fitting, using the epoxy sparingly for maximum strength and lightness.

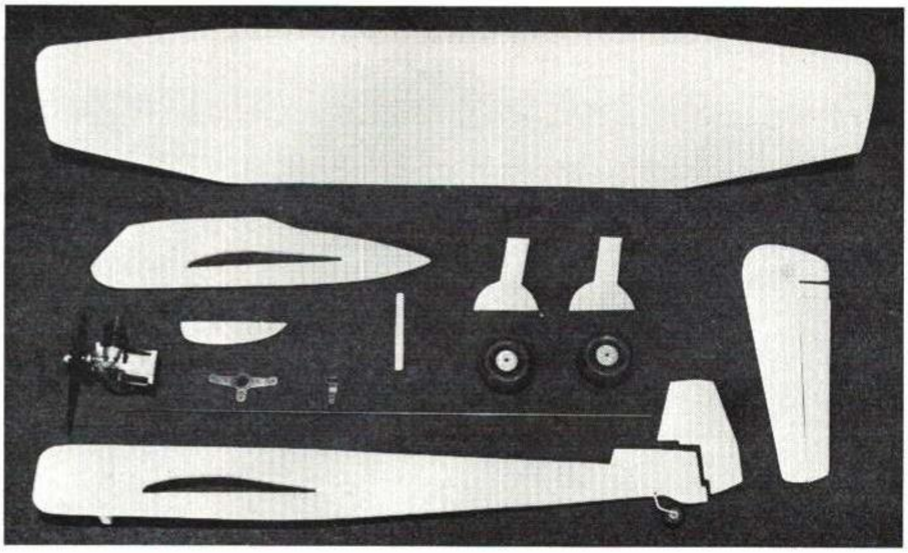
Wing: Trace the wing outline from the top view onto the soft-balsa wing material and cut out the wing. Cut the ¼ x ¼" groove for the landing-gear mount into the bottom surface of the wing panel. This can be done on a table saw, or by cutting along the two outside lines with a modeler's knife and chiseling out the remaining center wood.

Completely carve and shape the airfoil before cutting off the wings to add the dihedral. Using a razor plane or long knife, roughly shape the upper wing to the airfoil section shown on the side view. Starting with coarse garnet paper and using progressively finer paper, sand the wing airfoil to its final shape. Round off the wing tips. When the airfoil is complete, cut off the outer wing panels at the dihedral parting lines shown on the top view.

To reassemble the wing, place the center panel on a flat surface and add weights to hold it in place. Set the outer wing panels in place and block them up to 1" dihedral at the tips. Carve, sand and fit the joint surfaces to the proper angle to eliminate all cracks at the dihedral joint. Epoxy the outer panels into place.

Make only the two upper bends in each landing-gear wire. Drill a $\frac{3}{32}$" hole through each end of the hardwood landing-gear

Continued on page 66



Author used the new McCoy-Testor 049. Rewind-starter-equipped, it comes with the tank-mount. Engine mounting method is unique and suitable for any profile model.

NEW PRODUCTS CHECK LIST

Write the manufacturers for more data; tell them, "I saw it in American Aircraft Modeler."

FRANK PIERCE

John W. Caler Publications / Aero Publishers 1970 Book Catalog. Worth an hour of browsing in itself, catalog has hundreds of entries for all types of aviation books, everything from essays to technical data, pamphlets to hard-bound books. 24 pages. This, other book info, from **John W. Caler Publications,** 7506 Clybourn Ave., Sun Valley, Calif. 91352

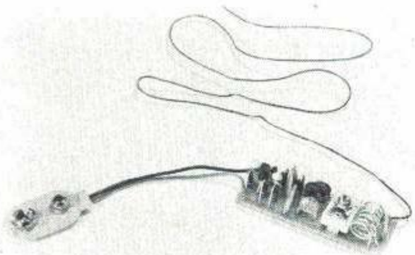
Italaerei / Fiat G55. In 1/72 scale, kit is one of series of well-made, highly detailed Italian commercial and military aircraft. No run-of-the-mill models in this interesting series. Others: **Ansaldo, Caproni Ca. 311, Macchi MB 326,** many more. **Italaerei Model Import Co.,** Box 5607, Las Vegas, Nev. 89102

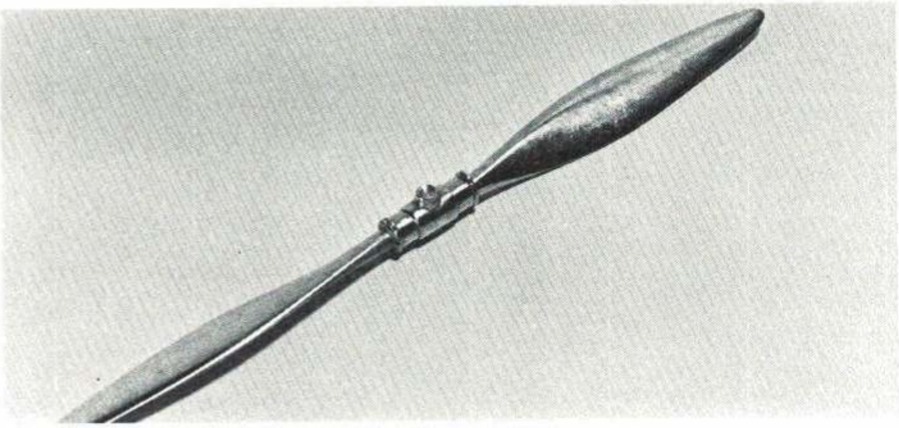
National Electro Dynamics, Inc./ TM-1 FM Xmtr. Less than 1 oz., transmitter can be installed in free flight models, rockets, etc. Generates audio tone on 105 mc., allows you to locate lost, downed models with the aid of any portable FM receiver. $14.95. **National Electro Dynamics, Inc.,** Box 25, Cleveland, Ohio 44121

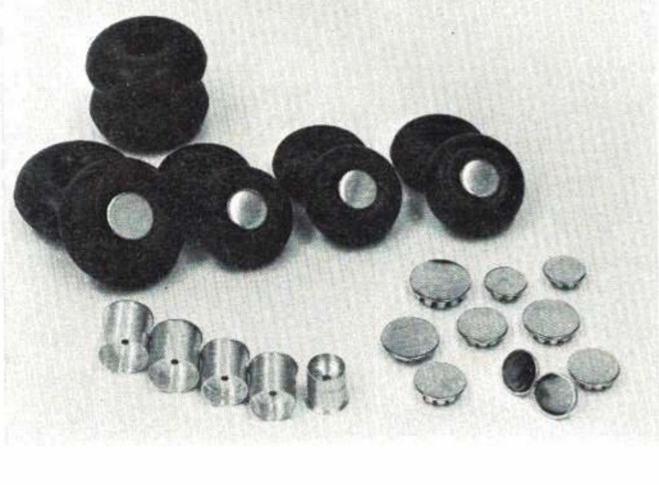
Vintage Model Aircraft/Scale prop. Beautifull all-metal scale model of famous **Hamilton Standard** propeller available in 9", 11", 13" sizes. Ideal as desk ornament, gift, trophy. $4.95. **Vintage Model Aircraft,** Box 219, Coos Bay, Ore. 97420

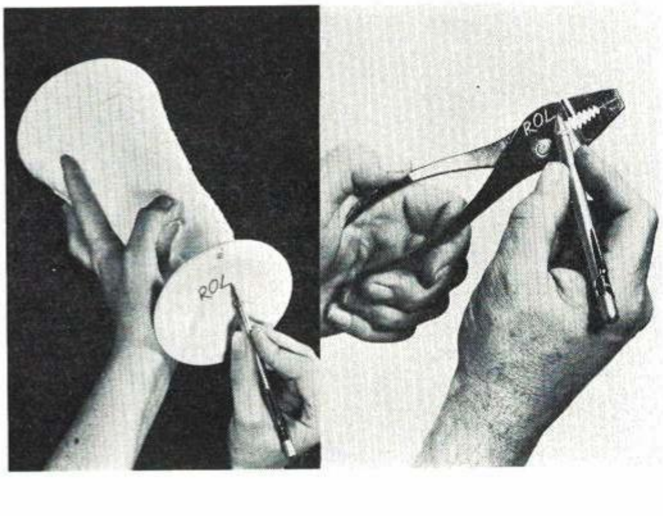
Joy Products Co./ Scale wheels. Of resilient, shock-absorbing synthetic rubber, wheels use machined aluminum hubs, nickel-plated caps, recessed axles. In 2, 2¼, 2½, 2¾, and 3" diameters at $1 per inch. **Joy Products Company,** Box 24, Menominee, Mich. 49858

Rolyn Optics Co./ Marking tool. Puts permanent marking on engines, tools, RC gear, etc. Use on electronic parts where vibration of conventional engraver might damage equipment. Uses precision polished-diamond tip. $7.95 including spare tip. **Rolyn Optics Co.,** 300 Rolyn Pl., Arcadia, Calif. 91006







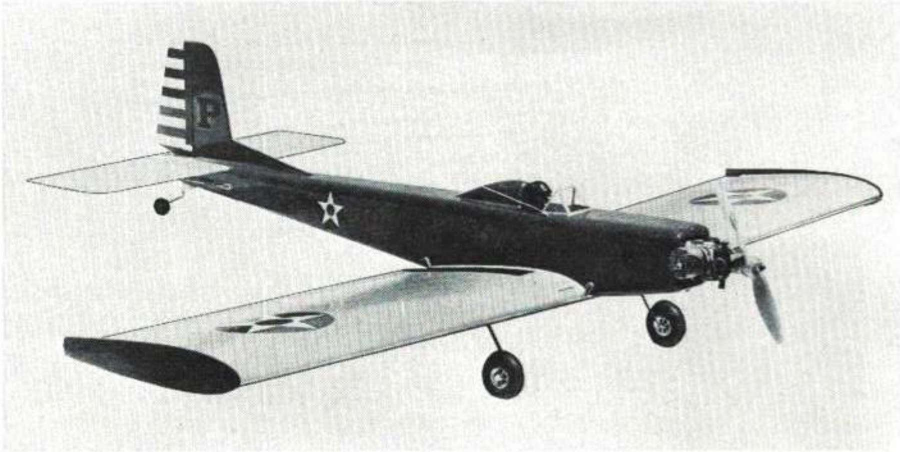


Ace R/C, Inc./ Relayless receiver. Ultra-small DE superhet is designed primarily for use with dual-coil magnetic actuators. Pulse-proportional receiver features long range, good noise rejection. Power: 2.4-volt nicads. Available in five frequencies. **Ace R/C, Inc.,** Higginsville, Mo. 64037

Indy R/C Sales Co./ Glo Fuel. No. 1 Competition glo fuel, 15% nitro-based methanol, is double-filtered, high quality for clean burning. Additive gives lower engine operating temperatures. **Indy R/C Sales Co.,** 10006 N. College Ave., Indianapolis, Ind. 46280

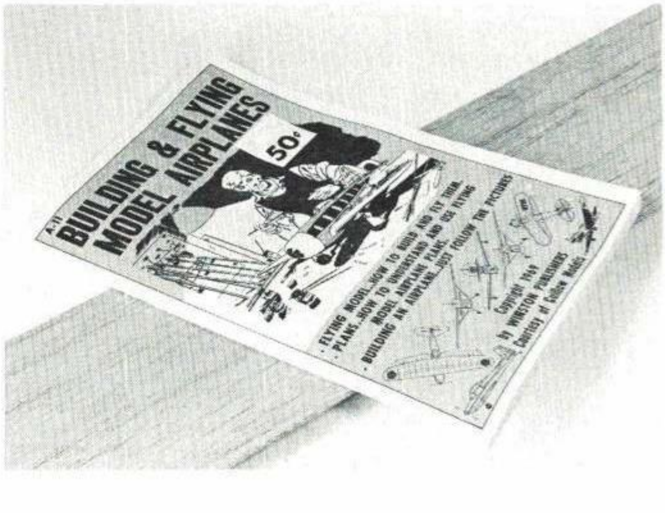
Jetline Products / Fuel Lines. Made of thick-walled surgical tubing, line resists kinking and doubling in tight places. 18", 39 cents; 36", 69 cents. Impervious to glo fuels. **Jetline Products,** Box 22, Belleville, Tenn. 37021

America's Hobby Center, Inc./ Winston Mini-Book. Great for the tenderfoot, a reprint of three classic **Guillow** books under one cover. All a beginner needs to read to build, fly rubber power. 64 pages of timeless data from the Forties. 50 cents. **America's Hobby Center, Inc.,** 146 W. 22 St., New York, N. Y. 10011



Estes Industries/Astron Sprint rocket. Designed for high performance but easy assembly, sprints to altitudes near 1600'. Precut fins, tail cone, decals, instructions. $1.75 less engine. **Estes Industries, Inc.,** Box 227, Penrose, Colo. 81240

Flight-Line Products/Skooter II. Colorful RC multi-channel job is ideal as trainer or for sports competition flying. Almost ARF, kit uses one-piece foam wing, precut sides, one-piece gear block. 48" span, recommended for 19 to 40 engines. $19.98. **Flight-Line Products,** 3207 34th St., Lubbock, Tex. 79410


A-11
BUILDING & FLYING
MODEL AIRPLANES
50¢
FLYING MODEL-HOW TO BUILD AND FLY THEM
PLANS-HOW TO UNDERSTAND AND USE FLYING MODEL AIRPLANE PLANS
BUILDING AN AIRPLANE-JUST FOLLOW THE PICTURES
Copyright 1969
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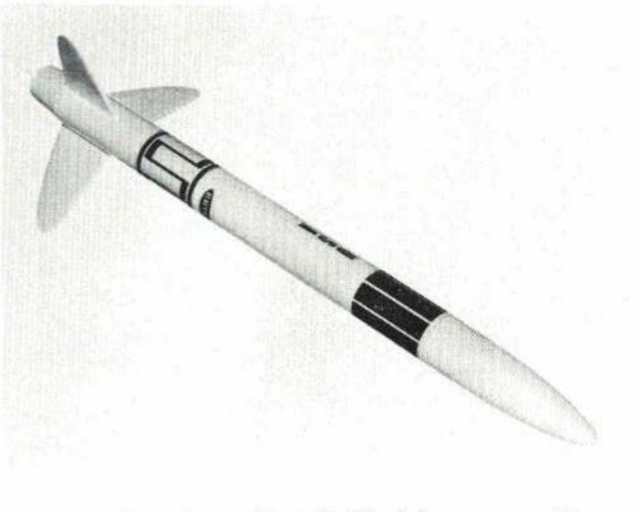
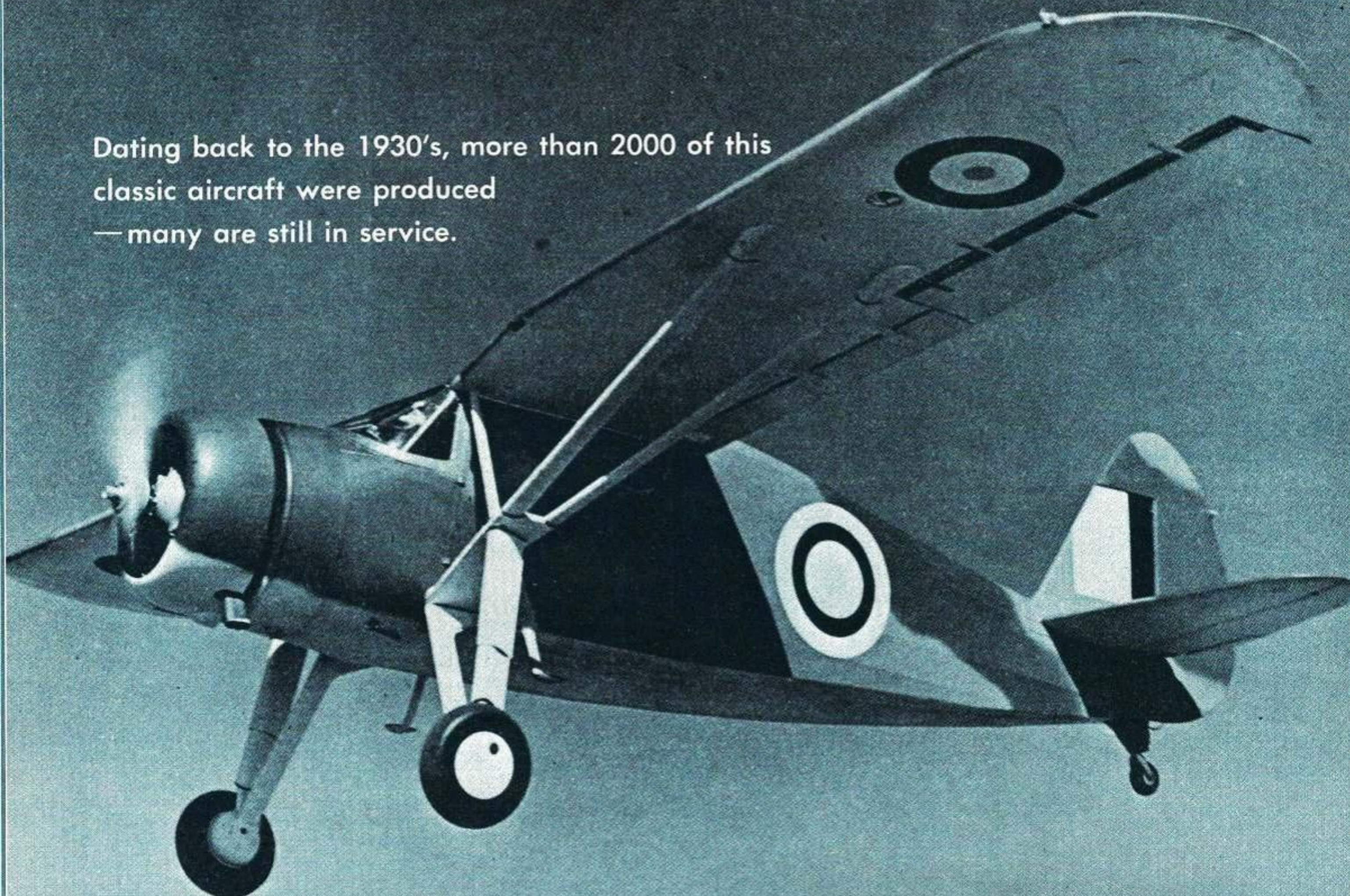




Dating back to the 1930's, more than 2000 of this classic aircraft were produced —many are still in service.

The Fairchild 24

DON BERLINER

THE Fairchild 24 is a classic.

Everybody knows what a classic is. Just don't try to pin anyone down on a definition, or things could get complicated and even emotional. The "24" fits the vague standards for a classic by having been around for a long time, by being much sought after by those who treasure old airplanes, and by having filled an important role during its production life and for years after.

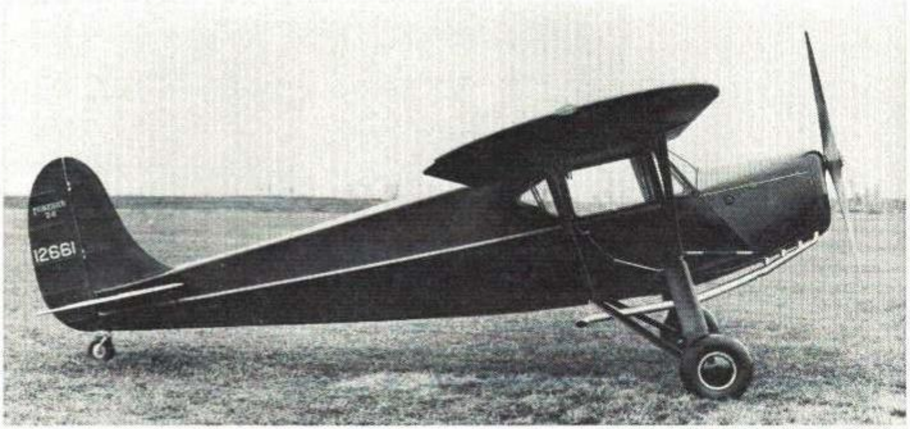
The simple, clean, rugged airplane with the complex landing gear was obviously ahead of its time. It offered so much that was needed by the relatively few who wanted light airplanes that it was able to survive the horrible shock of having been born in the depths of the Great Depression. When the economic problems of that era were replaced by the life-and-death problems of a world war, the peaceful Fairchild was drafted just like millions of others who knew nothing of fighting. And, like the others, it adapted to the needs of this strange new experience with admirable ease.

The direct forerunner of the 24 was the 22, of which about 85 were built as the parasol-winged version of the earlier Krieder-Reisner biplanes, during the early 1930's. While the F 22 failed to make the hoped-for impact on aviation, it did set a pattern for an airplane available with either an in-line engine (American Cirrus or Menasco) or radial engine (Warner Scarab). But the F 22 was a two-place open-cockpit airplane at a time when an increasing number of pilots were reacting to wind-in-the-face flying with shivers, rather than the pangs of nostalgia known today.

Even before the F 22 was phased out of production, the vastly improved F 24 came into being. The prototype was test-flown at Hagerstown, Md., in late 1931 and first shown to the public at the National Aircraft Show in Detroit in April, 1932. Comfort and practicality were the aims of the Fairchild design and construction team, and the F 24 amply fulfilled those requirements, having an unusually wide cabin, excellent visibility, sturdy landing gear and generally fine handling characteristics. Power was supplied by the American-built Blackburn Cirrus four-cylinder in-line engine, rated at 90 hp and giving rather limited performance: 90 mph cruise, 105 mph top speed.

The original F 24-C8 received its Department of Commerce Approved Type Certificate in June, 1932. But not even its reasonable (even by contemporary standards) price tag of $3,360 could overcome the handicap of the Depression, and only about a half dozen were sold. In 1933, the Cirrus engine was dropped in favor of giving the customer an option: either the 363-cu.-in., 125-hp four-cylinder in-line Menasco C4 Pirate, or the 422-cu.-in., 125-hp seven-cylinder radial Warner Scarab. The Warner was the clear favorite, 25 being sold with that engine and only two prototypes being built with the Menasco.

Not willing to give up on in-line engines, Fairchild then tried the six-cylinder 386-cu.-in., 145-hp Ranger 6-390-B in 1935 and had a success. Although both Warner and Ranger versions remained in production for the rest


All photos, The Smithsonian Institution

Opposite: Known by the RAF as Argus, and the U. S. as UC-61, late-model 24's saw wide WW II service as utility transports. Above: The 90-hp Cirrus 1933 prototype.

of the airplane's life, more than two-thirds of all F 24's bore the radial engine, even though the other offered cleaner, more graceful lines.

As the F 24 became accepted, it began to grow. The 1934 C8C model, of which 125 were built, had a jump seat in the baggage compartment for a third passenger, and 145 hp to carry the additional load. Other improvements at that time included better over-the-nose visibility, slotted Friese ailerons and all-ball-bearing control system.

Additional changes were made for the 1936 models, of which 50 were built with Warner engines and 40 with Rangers. Tail struts were eliminated, the cabin was enlarged, and the cowlings (both styles) were cleaned up. The brakes and landing gear were improved, and the ailerons dynamically balanced. In 1937, the Warner-powered 24's were available with an optional fourth passenger seat which became standard on all models from 1938. Also in 1938, the Ranger engine was enlarged to 411 cu. in. and rated at 165 hp. The airplanes remained basically the same until 1941, when the new 499-cu.-in., 165-hp Warner Super Scarab engine was introduced.

If there were relatively few changes in the appearance and specifications of the F 24 in the early 1940's, there were big changes in its use. With the coming of World War II, there was a great need for all kinds of airplanes — even types as peaceful as the popular Fairchild. After failing its tests to become a liaison craft due to excessive size and power, the F 24 was chosen by both the U. S. Army Air Corps and the Royal Air Force as a multi-purpose utility transport, and spent the war carrying VIP's, high-priority freight and information throughout the home front and many battlefield areas.

More than half the total lifetime production of F 24's was turned out during 1941-44 for the military: for the U. S. as various versions of the UC-61, and for the RAF as the Argus. With war needs far exceeding personal requirements, 34 privately-owned F 24's were "borrowed" by the Army and Navy (which called them GK-1). In addition, many Fairchilds were used by their civilian owners for submarine spotting and utility flying through the program of the new Civil Air Patrol.

Over 800 Argus were used by the RAF during the war, with more than 50 turned over to civilians when it ended. While the Fairchild was one of the most commonly seen of private types in England during the late 1940's, just three remain on the active list today.

In the U. S., the end of hostilities meant a quick return to civilian production. Temco, in Dallas, Tex., took over F 24 work for Fairchild, turning out almost 300 Warner-powered F 24-W46 and 441-cu.-in. Ranger 6-440-C2-powered F 24-R46 airplanes. The aviation industry had predicted great things for itself, envisioning hundreds of thousands of returning pilots demanding their own personal planes. But the great boom fizzled. F 24's were built until 1948 and then the 16-year-old design quietly called it quits, at least as far as production was concerned.

Of almost 2000 built from 12 to 27 years ago, hundreds live on, lugging miscellaneous cargo throughout the Americas — and transporting justifiably proud antiquers to the ever more numerous AAA and EAA fly-ins.

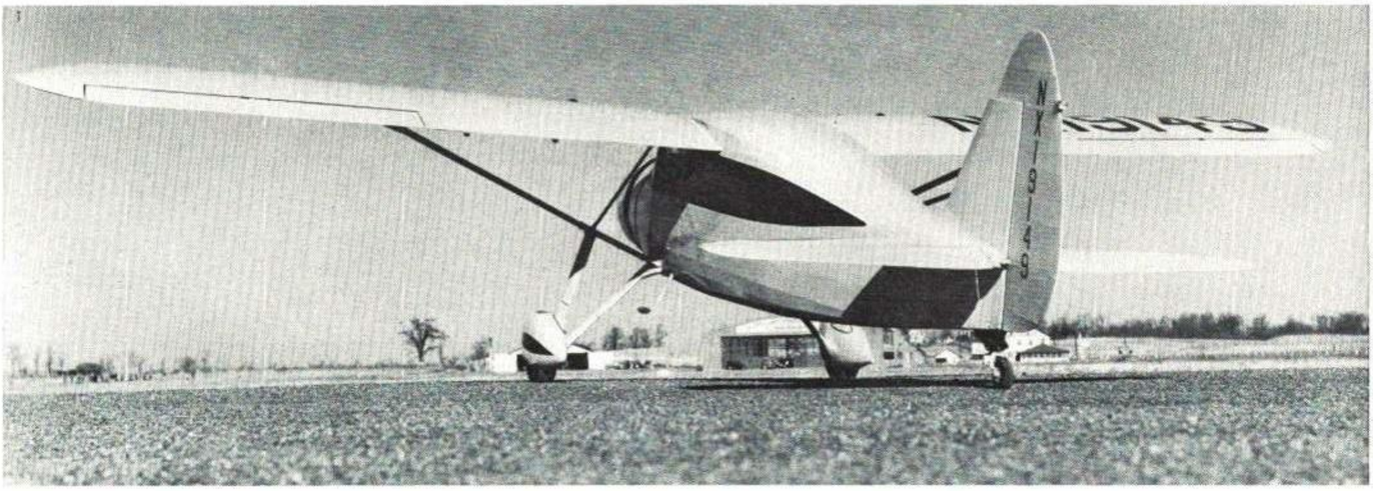
The F 24 was among the most successful light airplanes of the 1930's. It will probably be the late 1970's or early 1980's before the type becomes rare. One could hardly ask for more tangible evidence of an airplane's durability.

Fairchild versions and variants:

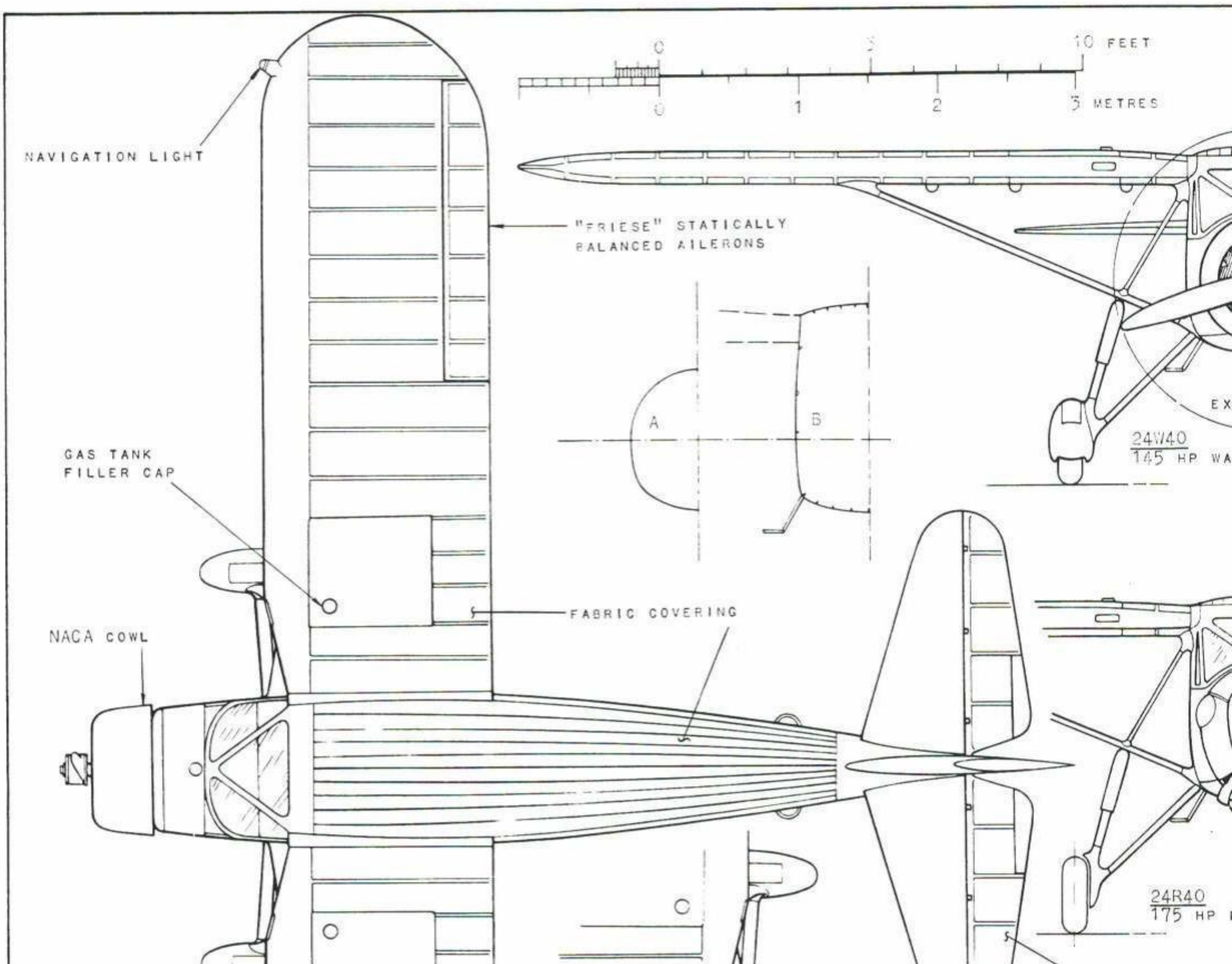
- **F 24-C8** — Prototype built in late 1931 with 90-hp American Cirrus Hi-Drive III. Six or seven built.
- **F 24-C8A** — 18 or 19 built in 1933 with 125-hp Warner Super Scarab engine.
- **F 24-C8B** — 2 built in 1933 with 125-hp Menasco C4 Pirate engine.
- **F 24-C8C** — 125 built in 1934 with 145-hp Warner Super Scarab engine.
- **F 24-C8D** — 10 built in 1935 with 145-hp Ranger 6-390-B engine.
- **F 24-C8E** — 50 built in 1936 with 145-hp Warner Super Scarab engine.
- **F 24-C8F** — 40 built in 1936 with 145-hp Ranger 6-390-D engine.
- **F 24-G** — 100 built in 1937 with 145-hp Warner Super Scarab engine.
- **F 24-H** — 25 built in 1937 with 150-hp Ranger 6-390-D3 engine.
- **F 24-J** — 10 built in 1938 with 145-hp Warner Super Scarab engine.
- **F 24-K** — 60 built in 1938 with 165-hp Ranger 6-410-B1 engine.
- **F 24-R9** — 35 built in 1939 with 165-hp Ranger 6-410-B1 engine.
- **F 24-W9** — 30 built in 1939 with 145-hp Warner Super Scarab engine.
- **F 24-R40** — 25 built in 1940 with 175-hp Ranger 6-410-B3 engine.
- **F 24-W40** — 75 built in 1940 with 145-hp Warner Super Scarab engine.
- **F 24-W41** — 30 civil versions built in 1941 with 165-hp Warner Super Scarab engine.
- **F 24-W41A** — military version of F 24-W41.
- **F 24-R46** — built in 1946 with 175-hp Ranger

Continued on page 68

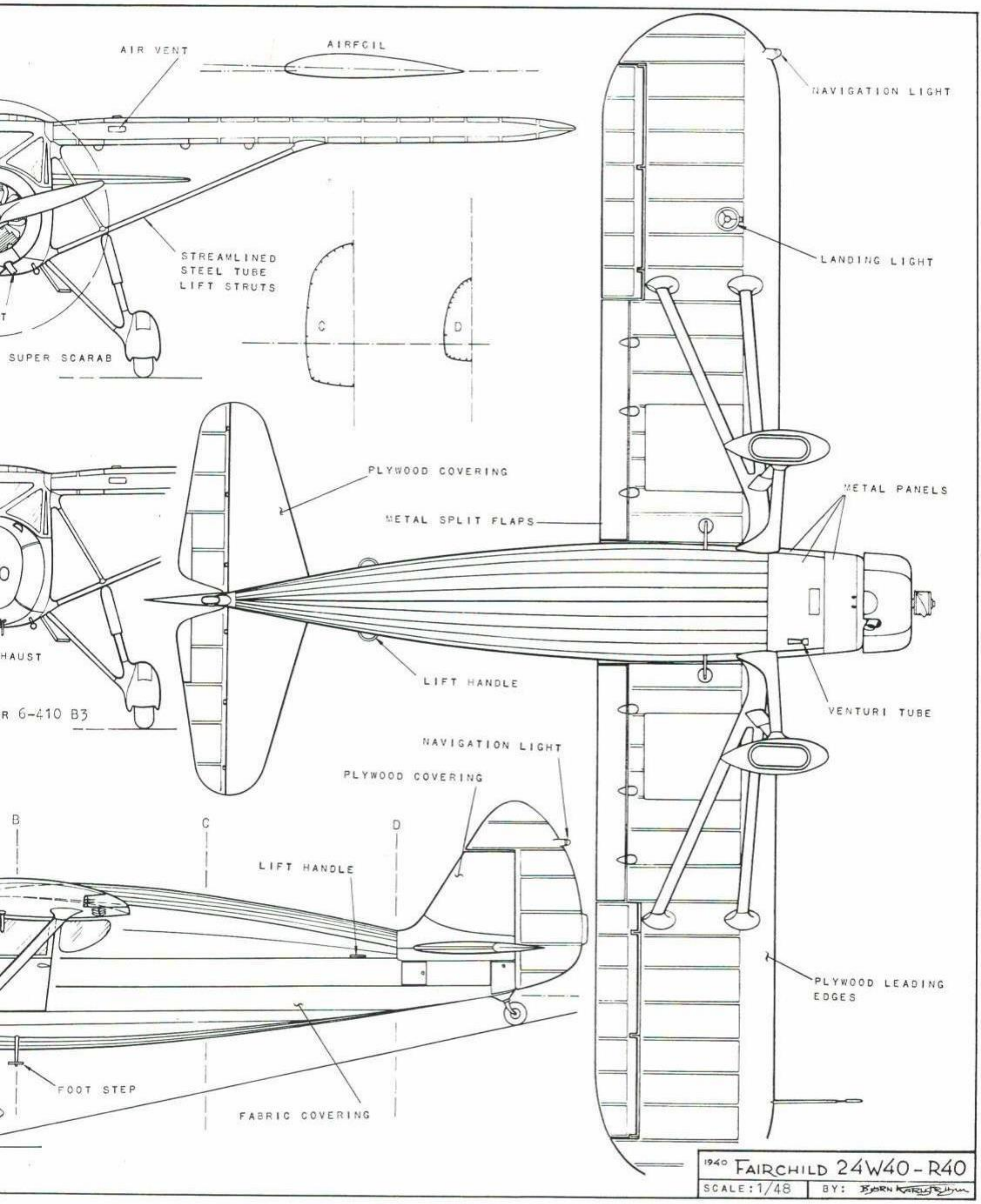
Specifications:	F 24-C8	F 24-R46
Wingspan	35' 5"	36' 4"
Length	23' 2"	25' 10¼"
Wing Area	170 sq. ft.	193.3 sq. ft.
Empty Weight	1030 lbs.	1650 lbs.
Gross Weight	1600 lbs.	2560 lbs.
Performance:		
Maximum Speed	105 mph	133 mph
Cruising Speed	90 mph	118 mph
Stalling Speed	50 mph	52 mph
Rate of Climb	700 fpm	800 fpm
Service Ceiling	12,000'	14,000'
Cruising Range	350 mi.	640 mi.



Paint scheme most remembered by Fairchild buffs was this one by industrial designer Raymond Loewy. Production ceased in 1948.



1940 Fairchild 24W40-R40



Long a popular scale-modeling project because of excellent proportions and lines, the version shown here was mass-produced just prior to, and during, World War II. Both in-line and radial-engine versions of this famous cabin craft were commonplace. For modeling, in-line job offers easier construction, nose length for balance.

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JUST FOR YOUR INFORMATION:

Dear R/C Modeler:

This column is a new departure for us. Based on requests from many of you, we will try to give you bits of news on simple R/O pulse in our ads as well as our regular newsletters.

First, is the "Go-Go Tail" of the month award. This goes to Russ Merrill of Hillcrest Hobby Craft, 3921 Fifth Ave., San Diego, California, 92103. Russ is one of the organizers of the San Diego Bushwhackers--which is composed ONLY of Pulse Propo fliers.

Russ has been selling more of our Commander R/O packages than would be believable if we gave you the statistics. He says demonstrations are the best selling factor. He also mentions that the extreme lightness of weight, the flexibility of installation, and the customer's ability to change the configuration around from Baby to Standard to Stomper, are of great interest and appealing to the modeler. Russ is an ardent booster of the Nomad soaring type glider, and sees the pulse field as a growing trend in all areas of the country.

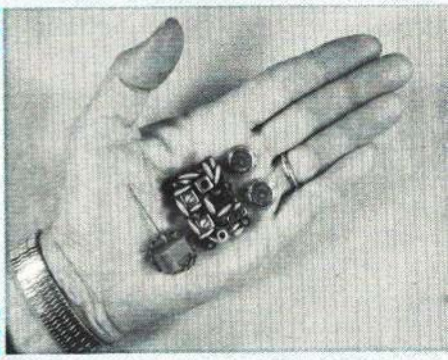
We also want to thank Russ for making us an honorary member of the San Diego Bushwhackers. Russ is president of this R/O Pulse Club. He, along with Bob Petro, of Bob's Hobby Shop, also of San Diego, have been instrumental in organizing and running several rudder-only contests.

And the "nervous" or Go-Go Tail is no problem. This comment from Lewis E. Goyette of Roanoke, Virginia: "I had shied away from Pulse Rudder because I mistakenly thought the flapping rudder would be objectionable. I was 100% wrong. It brought an exciting new experience to an old free-flighter surrounded by trees and hills."

Or take this one from Bruce Heath, Kingsbury, Calif.: "My combo with your Commander R/O DE receiver has functioned flawlessley. I have 40 flights on my FOURTH Schoolboy. The other three just plain wore out!"

That's it for now, we'll have more in future issues, and we also are preparing certain manuals which cover R/O pulse flying, R/O pulse versatility, construction of simple R/O planes, and other fields to help the fastest growing phase of the R/C Hobby--Rudder-Only Pulse Proportional.

Other details of some of our new items are mentioned in our advertising.



A HANDFUL FOR YOUR PLEASURE

For the modeler who has been looking fo superhet systems which are ultra light to go ir to the mini and micro series of airplanes

Weight of the receiver and the small Benter is less than 1 ounce, and depending on you battery choice you can keep the weight wel under 1¼ ounces.

This is excellent for the mini and micr plane enthusiasts, and also is finding increasin use in the boost glide phase of model rocketry

We are listing below all of the component that are required for an ultra light weight in stallation, and you can select your handful o pleasure to fit your application.

The receiver is compatible with our R/C Pulse Commander Transmitter, and this may b had separately or you can add this handful o pleasure airborne package to your present R/C system.

COMMANDER MICRO GEM RECEIVER

The Micro Gem is available in two model This is a proven design of which thousands ar in satisfactory use throughout the world. Th receiver measures 1 1/16 x 1 1/2 x 1/2 inche Weight of the bare receiver less hook-up wire is .5 ounces. With light weight hook-up wir is .7 ounces. Operation is on 2.4 volts wit phenomenal range; may be used with 3 volt

The two models are the DE, which has double ended output to feed into the Adam style actuator, and the SEB, which is designe for the Bentert type of actuator only.

No. 12K2—Commander DE Gem Rx	$31.5
No. 12K3—Commander SEB Gem Rx (For the Bentert only)	30.7

(Available all 27 MHz except 27.255.)

COMMANDER R/O TRANSMITTER

The foregoing receivers are compatible wit our Commander Pulse Transmitters. Requires volt battery of the M1603 type.

No. 11K1—Commander R/O Tx	$42.5

(Available all 27 MHz except 27.255.)

BENTERT ACTUATORS

These are single coil units witn magneti return. Small model weighs 7.5 grams an draws 50 ma at 3 volts. Large model weigh 15 grams and draws 80 ma at 3 volts.

No. 14K1—Small Bentert Actuator	$9.9
No. 14K2—Large Bentert Actuator	9.9

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Non-rechargeable 1 1/2V. Good for 60-9 minutes with Gem and Bentert. Only 2.2 gram .46 x .21".

No. 38K32—MS76 Silver Oxide cell, ea.	$.5

50 MA BUTTON NICAD

Rechargeable 1.25V. Only 3 grams; .606 .230". Solder tabs.

No. 38L4—Nicad B50T Button/tabs, ea.	$1.3

100 MA BUTTON NICAD

Rechargeable 1.25V. Only 8.5 grams; 63/6 x 1/4". Solder tabs.

No. 38K29—Nicad B100T/tabs, ea.	$1.7

2.4V/B100T PACK

Two of above 100 ma cells stacked for 2.4 pack with tabs. Measure 63/64 x 1/2".

No. 38K9—2.4V/B100T Pack	$3.6

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- **EASY** to install
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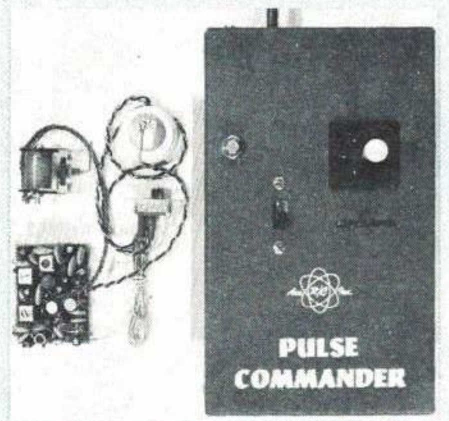
- **FUN!**

GEM AVAILABLE FOR R/O PACKS

You can get the new Gem receiver with any of our Rudder Only packages if the size is of importance to you. Simply order by catalog number, specify GEM, and add $5.00 to the package cost.



COMMANDER R/O PULSE PACKAGES
Ideal for Beginners and Sport Flyers
Now available in four sizes!

The Commander R/O packages contain the Commander DE 2.4 superhet receiver, Commander Pulse Transmitter, Adams actuator size of your choice, and nickel cads, wired with on-off switch. AND each package saves you $10.00 over buying components separately.

The R/O Packages are available in 4 sizes for most sporting needs from the smallest to the larger aircraft--or boats. Ready for installation, completely wired and tested.

The Baby is for .010 to .020 jobs. Has two 225 ma Nickel Cadmiums and the regular Baby Adams. Airborne weight is 2.5 oz.

The Twin Baby is for hot .010 to .020 jobs. As above, except uses Twin Baby actuator. Airborne weight is 2.9 ounces.

The Standard uses the Single Adams for more power for .049 to .07 size. Uses larger capacity nickel cads. Airborne weight is 4.5 oz.

The Stomper uses the Twin Adams actuator for up to .15, or can be boosted for use with .19. Airborne weight is 4.9 oz.

(Charging equipment extra)

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Easy to build, easy to maintain, and low in cost and upkeep, this new breed is fine for beginners. AND more and more of the big plane fliers are joining in on the fun so they can keep their hands in--or teach their youngsters.

To help the Fun Plane along, Ace is offering two plans now. More later. These are full size with enough details to allow almost anyone with just a bit of experience to build and fly. They are designed specifically for radio gear of no more than 3 ounces--and here is where the new Commander R/O Baby Twin pack comes in. Just right and proven dependability!

Rudder-Only does allow you much more than simple steering--you can do loops, spirals, Split S, and many more. You can gain or lose altitude simply by widening or tightening your turn.

DICK'S DREAM

This 34" job is designed by Owen Kampen. Named for the late Dick Adams who developed the magnetic actuators. Essentially this is a scaled down Whiz Kid, but has a few features especially for this size plane. Easy construction. Plans are full size.

No. 13K29—Dick's Dream Plans	$1.00

CITABRIA

This semi scale is a design by Roman Bukolt. Has 34" span and features simple slab construction. Another eye catcher at the Toledo Conference. Full size.

No. 13K30—Citabria Plans	$1.00

COMMANDER GALLOPING GHOST

Rudder, Elevator, Motor--One Actuator

No. 10G18—Commander Ghost	$109.00

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No. 10G19—Commander FP	$139.00

All 27 mHZ frequencies, except 27.225.

COMMANDER CHARGERS

Now chargers of four different kinds as required by the Commander series of airborne units. Baby--25 ma at 2.4 v; S--Standard and Stomper--50 ma at 2.4 v; GG--60 ma at 3.6 v; FP--100 ma at 3.6 v. Assembled.

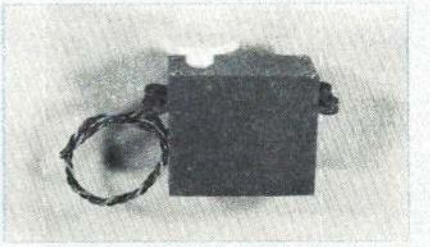
No. 34K4—Commander Baby Charger	$4.95
No. 34K5—Commander S* Charger	4.95
No. 34K6—Commander GG Charger	4.95
No. 34K7—Commander FP Charger	4.95

* Standard or Stomper

VARI CHARGER

If you want a more universal type of charger for your nickel cadmium battery supplies the Vari-Charger has much to recommend it. It features a high quality transformer and will charge up to 5 or more cells in series with up to 150 milliamp current. Charging rate is adjustable from 20 to 150 mils, with easy-to-use chart.

No. 34K21—Ace Vari Charger Assembled	9.95
No. 34K22—Ace Vari Charger Kit	7.95



KEN'S PULSE THROTTLE CONTROL

Manufactured by Ken's R/C this new unit uses a motor driven servo. Designed for high, medium and low throttle on Rudder Only Pulse systems, the control requires only slight modification to the Transmitter. Easy to hook up to airborne R/O Packs--just three wires. Uses same battery supply. Designed specifically for the Commander R/O series of Standard or Stomper size.

Housed in a WE S4 case. Completely wired and tested. Weight only 1¾ oz.

Transmitter modification is simple, since Throttle Control requires a fast pulse momentarily. Kit is available or complete custom factory conversion of your transmitter.

No. 14K69—Ken's R/O Throttle Control	$24.95

TRANSMITTER CONVERSION

Kit to allow you to convert your Commander R/O Transmitter for above motor control. Easy to follow instructions.

No. 14K70—Tx FP Throttle Control Kit	$3.00
No. 14E71—Factory Custom installation of above unit in your Tx (includes above kit)	$6.00

(Postage return paid)

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Sam Fly's Ballerina at 1969 Nats and the Art Chester Award. Race scheduling techniques involve the same processes for many events, including those in CL Team Race, Rat.

Pylon Race Scheduling

Nationals pylon racing event director, Lou DeLateur, provides an inside look at Registration, Scheduling, Matrixes, and Handicapping for all RC racing events.

THE planning and paperwork required to run an average pylon racing event exceeds anything previously encountered in model airplane contests. The following step-by-step instructions and suggestions will develop basic scheduling theory and point out some of the pitfalls to avoid in making up race schedules. Pylon fliers will be interested to learn why, at some contests, they seem to draw Freddy Fasttime on every round while somebody else always seems to luck out with Sick Engine Sam.

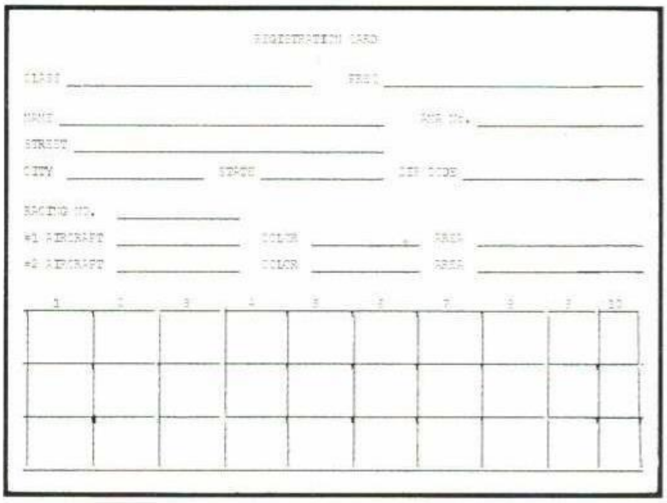
Registration: To minimize paperwork, only two basic forms are used for Sport, Formula II, and FAI racing: the registration card and the race sheet. A third, the scale judging form, is recommended for Formula I. The five by eight registration card, similar to those used at the Nats, records all of an individual's results in one place. This simplifies completion of the AMA contest report. The cards also are used to make up race schedules, as will be explained later.

Besides listing the contestant's complete name, address, and AMA number, the card records, in the upper right-hand corner, the frequency he flies on. This is an aid in race scheduling. A complete description of the aircraft, including racing number and colors, is essential for identification during scale judging, processing, and operations. The lower half of the card can be marked off for recording results.

Scheduling: Avoiding frequency conflicts is essential. Other basic criteria for scheduling a set of rounds are: (1) Every flier flies an equal number of times; (2) Every flier has a chance for an equal number of points; and (3) No two fliers race each other more than once.

The first criterion is met by using a basic scheduling matrix and transforming it to provide additional rounds. The second requires that every race be flown for the same number of points: i.e., all races must be three-plane races for four points, for first place. Thus, if a flier finds himself in a one-plane heat because the others have crashed or for any other reason, he still gets the full points for first place, providing he flies his ten laps under competition conditions. The third criteria, although not mandatory, is highly desirable and can be met by judicious selection of the appropriate scheduling matrix.

Scheduling Matrices: The basic scheduling matrix shown is used for the finals at the Nationals. Each number represents a flier. All those on the same frequency must be in the same column, with a maximum of five fliers allowed on the same frequency. The matrix meets all of the above criteria. It provides five four-plane races in each round. Five rounds allow each flier to race every other once and only once, except for those



REGISTRATION CARD

CLASS ______ FREQ. ______

NAME ______ AMA NO. ______

STREET ______

CITY ______ STATE ______ ZIP CODE ______

RACING NO. ______

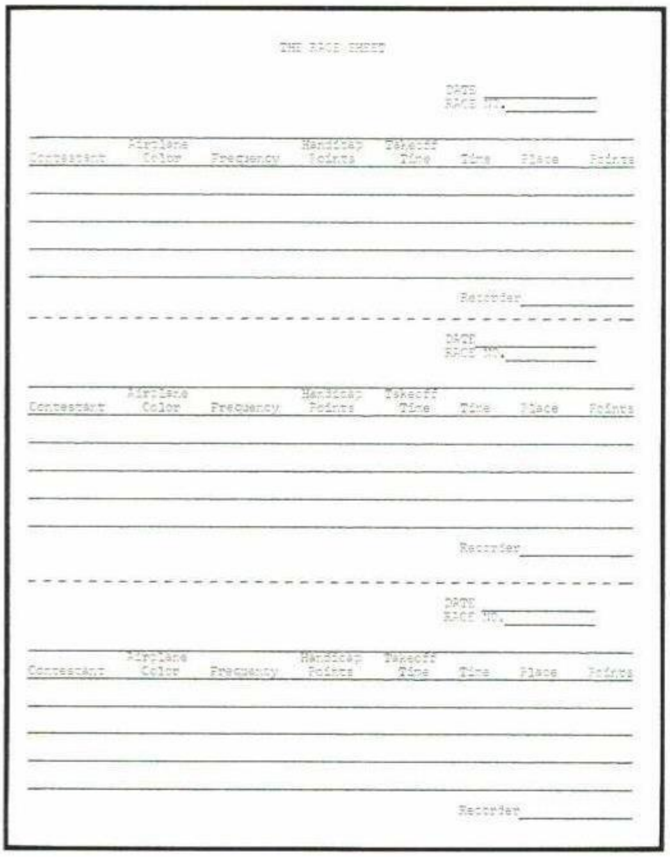
#1 AIRCRAFT ______ COLOR ______ FREQ. ______

#2 AIRCRAFT ______ COLOR ______ FREQ. ______

1	2	3	4	5	6	7	8	9	10

Entrants fill out similar forms printed on 5 x 8 cards. Cards remain with timekeepers. Each flight is scored.

Granger Williams' racer from his kit was quite a winner on West Coast. Called the La Jollita, or Miss San Bernardino.



THE RACE SHEET

DATE ______
RACE NO. ______

Contestant	Airplane Color	Frequency	Handicap Points	Takeoff Time	Time	Place	Points

Recorder ______

DATE ______
RACE NO. ______

Contestant	Airplane Color	Frequency	Handicap Points	Takeoff Time	Time	Place	Points

Recorder ______

DATE ______
RACE NO. ______

Contestant	Airplane Color	Frequency	Handicap Points	Takeoff Time	Time	Place	Points

Recorder ______

Race sheets are used by the officials at the starting line for heat-by-heat recording of race results.

in his own frequency group (column).

1	6	11	16
2	7	12	17
3	8	13	18
4	9	14	19
5	10	15	20

The five rows provide the five heats of the first round. Thus, the first heat is made up of numbers 1, 6, 11, and 16. The second heat is numbers 2, 7, 12, and 17. Because all of those on the same frequency are in the same column, frequency conflicts are eliminated.

The next round is obtained by transforming the first matrix in the following manner. Draw a diagonal through number 1, 7, 13, and 19 and make these the first row of the next matrix. Then fill in the rest of the columns as shown:

1	7	13	19
2	8	14	20
3	9	15	16
4	10	11	17
5	6	12	18

Notice that the numbers in the columns keep rotating, e.g., 11 follows 15 and 16 follows 20. The next round is determined in the same manner, i.e., by drawing a diagonal through 1, 8, 15, and 17 and making these the start of the columns for the third round.

At this point, try making up the next four rounds in the same manner, for a total of six rounds. The sixth round should be identical to the first. If it is not, go back and find the error(s). This provides a complete set of schedules for one set of five rounds. The sixth is a necessary check for a balanced matrix.

Those who do not want to persist with the numbers have a place reserved for them at the number one pylon. They may wait for the section entitled Operations. Or, if tired of the whole idea, Bill Northrop can always use more pattern judges!

Matrix Inspection: To check out a matrix for violations of the third criterion use the following method. While this exercise is not necessary in practice, it is useful as a backup and for understanding the technique. Lay out the initial matrix as shown next, extending the second and third columns as required.

1	6	11	16
2	7	12	17
3	8	13	18
4	9	14	19
5	10	15	20
	6	11	16
		12	17
		.	.
		.	.
		.	.

In order to examine the matrix, draw consecutive diagonals from number one, i.e., 1, 6, 11, and 16; 1, 7, 13, and 19; 1, 8, 15, and 17; until flier number one is matched against every flier in the second column. Notice, one number is skipped, in the third column and two numbers in the fourth column each time. All the races involving flier number one are now defined. Examine the diagonals to see that, at the end of five rounds, he has flown against every other flier once and only once. If the diagonals from number one show no duplication, the same will be true for the heats involving the other fliers in the first column.

All of the above applies for 20 entries with no more than five on one frequency. For more than 20, extend the columns. For 24, the first column is one through six and so on for the others. There are six heats per round. This is how the 13 heats to a round were made up at the Western States Championships last year. At the other end of the spectrum, 11 entries with six on one frequency resulted in a thrilling day of two-plane races, using two columns.

Less than Twenty Entries: Matrices with less than five rows, i.e., less than five fliers in a column, do not behave very well as far as the third criterion is concerned; all fliers should race each other once and only once during a set of rounds. Using pencil and paper, examine the two, three, and four row matrices which are used for events with a small number of entries.

Two by Four Matrix: This matrix can be used for less than nine entries, with no more than two on the same frequency. Lay out the following matrix:

1	3	5	7
2	4	6	8
		5	7
			8

The first round is the horizontals. Drawing the diagonals for the second round shows that this matrix will give races for pairs of fliers. Nothing else can be done with this small a number. For six entries, use only the first three columns. To make up the second set of rounds shift the fliers between the columns so that at the end of four or six rounds each flier has flown against every other the same number of times. For seven to nine fliers, three-plane heats using the following three-row matrix gives a balanced set of rounds.

Three Row Matrix: Lay out the following three by four matrix, expand the third and fourth columns, and draw the diagonals from number one;

1	4	7	10
2	5	8	11
3	6	9	12

This provides three rounds of three heats each. The first three columns give a balanced set. However, in the fourth column, 1 and 10 are paired up each time; similarly, 2 and 11 and 3 and 12. Consequently, the three-row matrix is only good for three-plane races with a maximum of nine entries.

Three-plane races are fine for small events, particularly with inexperienced fliers and officials. However, more time is required for each flier to race the same number of times than with four-plane races. With a small number of entries this is usually no problem.

Ralph Brooke prepares a Formula I Shoestring for a race. Real Shoestring is one of the best-known and oldest racers still competing. In level flight it easily exceeds 225 mph.

Four Row Matrix: Lay out a four by four matrix, expand it, and draw the diagonals as before. It will be evident why this matrix is a loser and has caused more complaints than anything else. The third column keeps repeating every other round and is useless. The second and fourth columns are duplicated in the first and third rounds and in the second and fourth rounds.

However, for ten to 12 entries, a three-plane race event using the first, second, and fourth columns is the best that can be done. In assigning fliers to the columns and setting up the heats, simply ignore the third column.

Norm Hooper's beautiful white and orange Shoestring has one-piece airframe.

Five Row Matrix: The five-row matrix was investigated earlier using four columns for the 20-entry event. For 12 to 15 entries, the first three columns of the matrix can be used to provide a balanced set of five rounds of three-plane races in a total of 25 heats. For 16 to 20 entries, use the five by four matrix.

Balanced Matrices: balanced set of rounds:

— 3 by 3 for 3 rounds for 9 entries
— 5 by 3 for 5 rounds for 15 entries
— 5 by 4 for 5 rounds for 20 entries
— 7 by 3 for 7 rounds for 21 entries
— 7 by 4 for 7 rounds for 28 entries

The last is an extrapolation and the development of the six- and seven-row matrices is left for the reader. The rule seems to be that the number of rows must be a prime number in order to have a balanced set of rounds.

Balance Preferred: Emphasis is placed on balanced sets because ghost entries or blank cards are usually required to fill out a matrix. As a result, some heats will be short a plane. Blanks should be all in the same column so that no heat will be short by more than one. By flying a balanced round, all contestants, except those in the same column, will be matched against each of the ghost fliers sometime during the set, thereby giving all an equal advantage.

Bob Kern kits limited quantities of this fast Shoestring. Well-filletted for speed.

All heats are for the same number of points throughout the set regardless of the number of planes that show up at the starting line. The number of ghost fliers should be kept as low as possible, but most fliers would rather fly against an occasional short field than fly against the same individual over and over.

The final standing is based on the individual's performance against the total field which can be obtained only by flying against as many different contestants as possible. Every time he doubles up on the same contestant he misses an opportunity to fly against another contestant.

Matrix Recommendations: The advantages and disadvantages of the various matrices are given below as a function of the number of entries. The maximum number on one frequency determines the minimum number of rows that can be used. These recommendations are based on personal judgment and experience. The reader has been given the tools to verify or question them.

Rows	Columns	Maximum Entries	Remarks
2	2, 3, 4	4, 6, 8	Use only for 7 or less.
3	3	9	Balanced. Use for 8 or 9.
3	4	12	Do not use.
4	3 out of 4	12	Use only for 10 or 11.
4	4	16	Do not use.
5	3	15	Balanced. Use for 12 to 15.
5	4	20	Balanced. Use for 16 to 20.
6	3	18	Avoid.
6	4	24	Avoid.
7	3	21	Balanced, but time-consuming.
7	4	28	Balanced.

The number of columns equals the number of planes in a heat.

Maximum entries equals the product of the rows by the columns.

Number of different rounds in a matrix set equals the number of rows.

Total heats in a matrix set is the square of the number of rows.

Race Makeup: The foregoing principles should be studied and mastered prior to the day of the race. Race makeup is best done by a team of two or more people who can then check on each other's work.

The time required to run off an event must also be considered. The rate at which heats can be completed varies with the number of planes in a heat, the experience of the officials, and the cooperation/experience of the fliers. The first several rounds are usually slow, but the rate picks up as the event moves along.

An average rate of eight heats per hour can be used for well-organized events. It can be increased to ten per hour by pushing. For a pylon contest, a rate of six per hour is suggested for planning. This keeps things from getting too hectic, particularly if manpower is short.

Matrix Selection: Using the registration cards, group the entries according to frequency. Note the maximum number on any one frequency and the total number of entries. Next select a matrix to be used for scheduling. For a sample case, assume the following groupings: one group of three, one group of four, three groups of two, four singles — for a total of 17 entries.

The 5 by 4 matrix will provide five rounds

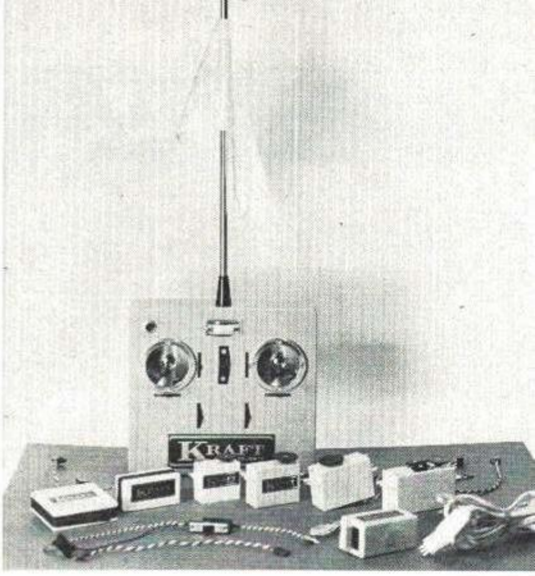
Continued on page 54

R/C TECHNICAL FEATURE

Kraft Series Seventy 6-Channel System

Blue Ribbon Review

FRED M. MARKS



Servos, left to right, KPS-12, -10, -11, and -9. Both 500 and 250 mah battery packs shown.

WRITING these reviews provides an opportunity to see and operate the many systems going and to observe their variety and ingenuity. Phil Kraft, a longtime modeler, developed the original Kraft single-channel receiver kitted by ACE in the late 1950's. A kitted reed system by ACE followed and, finally, Phil launched out on his own to manufacture the reed system and then the well-known KPS (Kraft Proportional Systems) series.

In addition to their research and development and massive testing and verification, manufacturers also have built solid dealer and repair organizations. The service philosophy varies from company to company. Local representative Harold Peterson exemplifies Kraft repair personnel, who are expected to be competent in all areas of repairs and service. In other instances, the manufacturers prefer that local repairs be limited to service of systems, replacement of batteries, and replacement of failed or damaged units in total, with detailed repair performed by skilled full-time technicians in the home plant.

The philosophy for the system tested is evident: simplicity and straightforward design meant to provide maximum reliability and ease in servicing. While the airborne system is extremely compact, it still achieves these goals with the use of discrete components and without any really tight packaging.

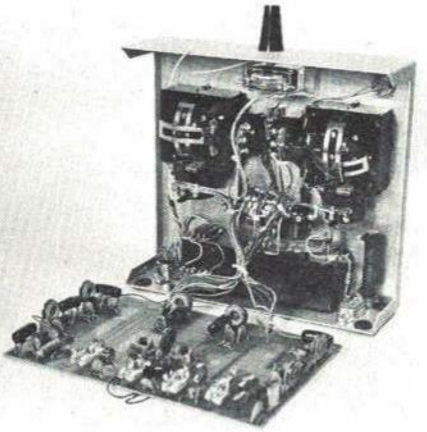
The system tested was the KP-6BII, 6-channel, 2-stick system with elevator and aileron on the right-hand stick. The 1970 system is available with either of three servo mechanisms: the familiar KPS-10 which has a rotary output only; the new larger KPS-11a which also has rotary (The KPS-11 was not tried, it has linear outputs in addition to the wheel.); and the KPS-12, a new ultra-small servo with rotary output only. The test system was equipped with four of each of the KPS-10 and KPS-12. Unfortunately, KPS-11's were not available at the time of the bench and flight tests.

The system arrived in a form-fitting styrofoam packing container. A cardboard insert was used to accommodate the various types of servos. The frequency chosen was 72.40 MHz (Orange and White frequency flag). The instructions, written for the 1969 system, were due for rewrite. However, only techniques for plugging are new. In the container was an impressive checklist which presents final inspection data for the system with the serial number identified and the technician's number noted. Some of the information provided, for example, was the transmitted pulse width in microseconds (350 in this case), a check of crystal frequency drift at 0 degrees F and 140 degrees F, receiver sensitivity (2uV), the Schmitt trigger pulse width (to the decoder), etc. It seems wise to keep this data with the system and return it with the set in the event of repairs.

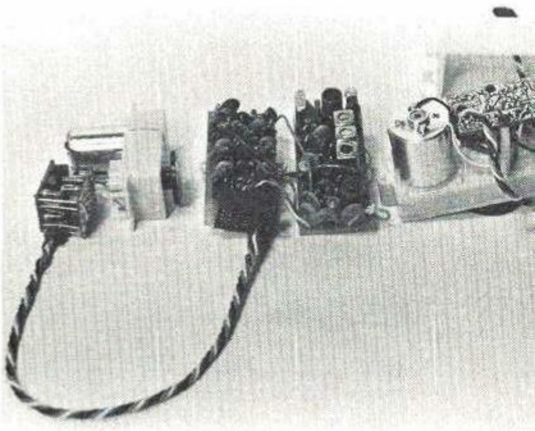
This system was reviewed in the usual fashion. Physical and electronic characteristics were determined, a set of performance tests were run, and the system was flight-tested.

The transmitter is housed in a gold-colored vinyl-clad case 7 x 6½ x 2". The molded nylon stick assembly features stick tips which may be slid in or out on the stick to accommodate people with long, skinny thumbs; short, fat thumbs; or those who wish to sling the transmitter from a lanyard about the neck and play the sticks like pipe organ stops. The trims are located conveniently adjacent to the sticks and are electromechanical in that the potentiometer is rotated for trim change. Stick action is extremely

Continued on page 85



Neat transmitter assembly. Sticks easily changed in mode, just relocate centering spring. High-grade wire-wound pots used.



Discrete components used throughout. Tiny KPS-12 has two-board amplifier, KPS-11 has one board. Note receiver plug block size.

Our Triton looked so much like a jet in flight, we wish the gear would retract. Kraft and Triton, nice for competition.

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CESSNA 210

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65. Lancaster 1
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Pylon Race Scheduling

Continued from page 52

in three to four hours of flying with 25 four-plane heats. For the average flier, five rounds are sufficient in one day. Beyond that the toll on engines and planes begins to mount up. Three blank cards are added to make up a total of 20 entries. Remember to treat these as one frequency group.

Column Grouping: From here on the schedule is based on the luck of the draw in order to make things as fair as possible. Three columns have been started with the four-member group, the three-member group and the three blank cards. Place these face down in three separate piles. Put the rest of the cards face down and have someone draw one card. If it is a single frequency, place it face down on the four member group. If it has a partner on the same frequency, place the two of them on one of the three-card piles. Continue drawing until there are four five-card piles, all still face down.

To assign column numbers, place four slips of paper numbered one to four in a hat. Have one person select a pile and another draw a number to assign to that pile. Arrange the piles in ascending order according to their number.

Number Assignment: Take the column cards still face down and shuffle them. Turn them over and mark them consecutively in the upper left-hand corner according to the numbers in the column, in this case one to five. Repeat the process to number the rest of the cards in each column.

This method may seem tedious, but it eliminates any complaints or insinuations. Contestants should be encouraged to participate in the drawings which should be as open as possible to avoid any suspicions.

Race Sheets: A standard race sheet consists of four lines for the contestants in a heat and is divided into columns with the following headings: Contestant, Airplane Color, Frequency, Handicap Points, Takeoff Time, Time, Place, and Points. See sample race sheet.

The form can be arranged to list three heats on an 8½ x 11" sheet. These race sheets will be used by the officials at the starting line for running each heat and recording the results. As such they are part of the official records.

Race Sheet Procedure: For Formula I, the scale judging points awarded each entry should be recorded on his registration card. These will be used to determine starting order and takeoff time. Arrange the four piles of cards face up in ascending order from left to right. The first heat is made up of the top cards: numbers 1, 5, 11, and 16 in the sample case. Check the frequencies to see that there has been no error.

The contestants' names are entered on the sheet according to their starting order; the contestant with the highest scale points first and the rest in descending order. The starting order for any ties should be settled at this time with a coin toss. The takeoff times can be calculated later or by a second team. The method will be explained under Handicapping.

When all the top cards have been entered on the race sheet, turn them over face down, keeping the columns separated. As a precaution do not turn any cards over until all entries in that heat have been recorded. The second heat is now face up on the cards: 2, 7, 12, and 17 in the sample case. Check frequencies. Proceed as before, recording one heat at a time until all cards have been recorded and turned face down. The first round is now completed.

Succeeding Rounds: Turn the cards face up again. The cards in each pile must be turned so that the top cards match the first diagonal on the original matrix. The first column is left as is. The second column has the top card placed on the bottom face up. The first two cards of the third column are placed on the bottom in their original order. The first three cards of the fourth column are placed on the bottom. The first heat of the second round is now face up, in this case 1, 7, 13, and 19. The number matrix for each round should be developed on a separate sheet of paper to be used as a check.

Continuous checking is essential. Since each step should be verified, it is recommended that two people work together continuously to monitor each other's operations.

Fill out the heats for the second and succeeding rounds. For balanced matrices the schedule should end with the original heat, after all the possible rounds have been flown. All the heat schedules for one set of rounds are now completed.

Once a set of rounds has been started, it should be flown to completion without alteration. The only exception is an individual who finds himself the only one ready to fly in his heat. He can be placed in another three-plane heat if there is no frequency conflict. He receives his first-place points providing he starts and completes his ten laps. He also flies with his own timer if first-place times are being recorded.

Additional Sets of Rounds: A second set of rounds may be desired, particularly for a two-day event. Before making up the second set, the cards of all entries who can no longer compete should be removed. This usually allows a smaller matrix to be used. The procedures are the same as before except for drawing to make up the four groups. At this point, if possible, vary the grouping of fliers using the same frequency. Because they were in the same column, they did not fly against each other, so a little judicious switching is advisable in order to expose them to each other. Nothing can be done about the ones flying on the same frequency.

Handicapping: This final chore is required to complete the race sheets. Again, two people working together should do the handicapping. Takeoff times are calculated from the scale points recorded on the race sheet. The highest flier has already been entered at the top of the heat. His takeoff time is zero. The next flier is delayed by the difference in seconds between his and the leader's scale points, with a one second minimum between takeoffs. Similarly, the third flier's takeoff time is equal to the difference between his and the first plane's score.

Takeoff times are always referenced to the first plane's score with a minimum of one second between takeoffs. A few examples should suffice: Scale points of:

18, 15, 14, and 13 gives 0, 3, 4, and 5.
17, 16, 16, and 15 gives 0, 1, 2, and 3.
19, 15, 14, and 10 gives 0, 4, 5, and 9.

Remember the ties were already decided by a coin toss when the contestants' names were entered on the race sheets.

For Formula II, FAI, and Sport, no handicap system is used. Takeoffs are one second apart and the order decided by lot. This can be done ahead of time, but most fliers like to do it at the starting line. Therefore, the starter should have four numbered slips for the drawing.

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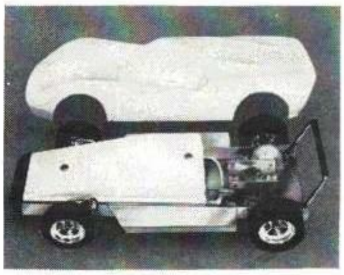

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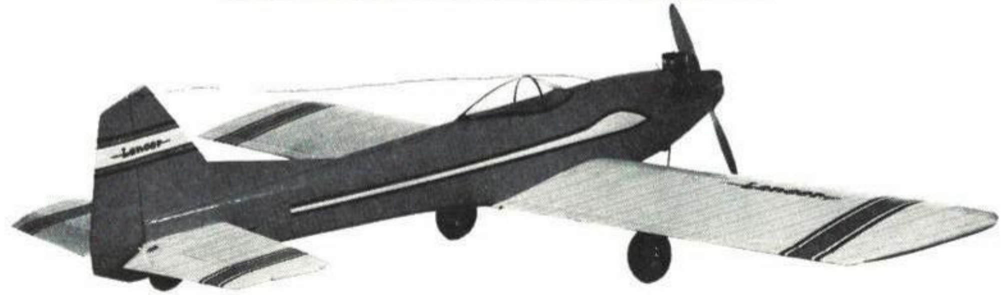

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AUGUST 1970

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Official magazine

A.M.A. NEWS

AMA

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Delta Dart is Key to N. Y. Club's Junior Program

Five-pronged effort by the AMA chartered Aeroguidance Society, working with Cub Scouts, Junior Deputies and Link Aviation, aims to never let happen an obituary like the one imagined below.

By Ed Abram
Chmn. AMA Junior Committee

June 21, 2020: Orville Longeron, last surviving member of the Academy of Model Aeronautics, has gone to that Great Airport in the Sky. With him goes the accumulated knowledge of nearly two centuries of modeling. Like his predecessors, Mr. Longeron firmly resisted the efforts of young people to participate in his hobby. He contended to the end that modeling was too expensive, too difficult, and too demanding to be considered a pastime for children. Mr. Longeron entered the Academy in the days when it was still permissible to use home-built models in competition. His collection of aircraft, some of the finest ever manufactured, will be donated to a museum. . . .

Does Orville's obituary sound far-fetched? If you really think so, look around and try to find some of the so-called leaders who are doing something to perpetuate the hobby. Many of the articles in the model press expound the same views as our imaginary friend. Contests have become showcases for the skills of the "pro" flyers, with the modeling aspects becoming subjugated to the flying ability of the contestant and the performance capabilities of his equipment. While contests of all types are drawing sufficient numbers of contestants, fly-for-fun events are still getting the biggest play. This may be because contests do not provide any enjoyment, but it is more likely that those who are new to the contest circuit simply aren't comfortable in the out-for-blood events. After a few successful experiences in fun events, some flyers are sure to take up the contest trail, but many more stick with sport flying if for no other reason than that they find few events suited to their talents.

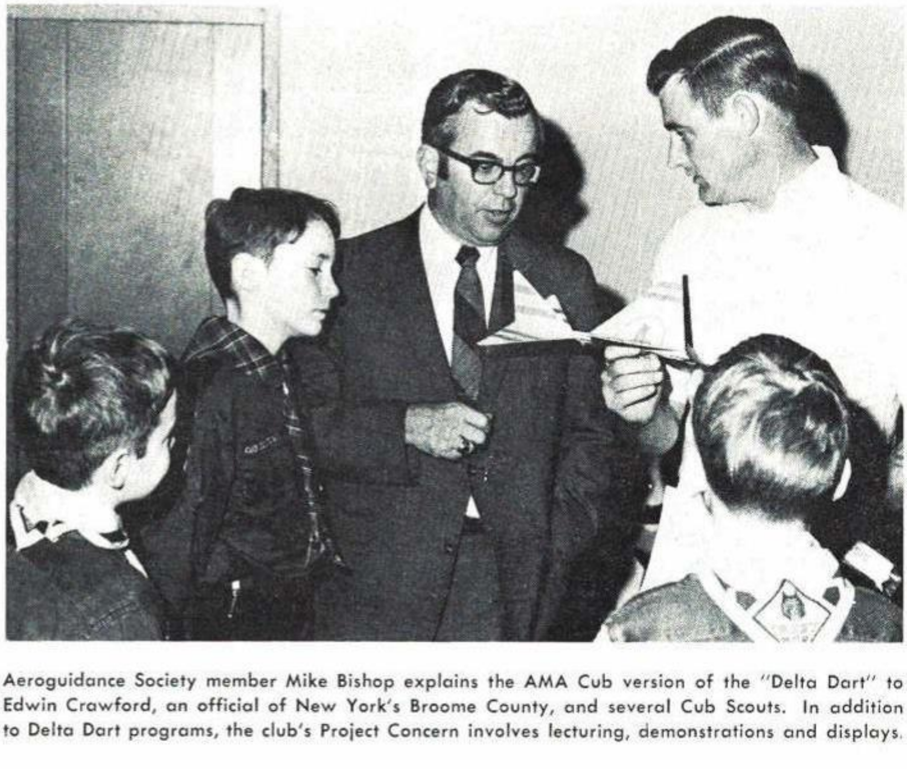
RC is generally considered the major offender, due to the well-publicized lack of any real beginner's event, and the subjugation of modeling to flying, but other categories are not without blame. Beginners in Rat Race, Speed and Combat are up against the whiz kids in contests, as well as most of the other CL classes. Free Flight, which would seem to be the most logical place for a beginner, is highly specialized and very demanding. If there is such a hue and cry for an "easy" RC event for Juniors, how about a Free Flight event designed to pick up where the Delta Dart leaves off? In other words, the whole works needs a second look.

Fortunately for the future of modeling, there are individuals like **Stu Richmond,** who runs a glider contest for the kids at the **New England RC Championships.** Unfortunately, these people are few and far between. Even more infrequent are groups such as the **Aeroguidance Society** of Endicott, N. Y., with a club roster that reads like a who's who of RC. This group has initiated **Project Concern,** a five-point program to help their club, modeling in general, and kids in particular.

Project Concern involves all the club members. Lecturers, demonstration flyers, and static displays are provided for civic, service, and school groups. Other members provide news media with material on club activities. **But the big part of the program is the Delta Dart campaign,** which should eventually reach nearly every kid in a three-county area. Here is a group of some of the finest Pattern, Scale and Goodyear flyers in the nation in an all-out effort to interest the kids in a homely little rubber-powered stick model!

For the uninitiated, the Delta Dart is a small paper-covered model of less than classic proportions. The only thing outstanding about the Dart is — it flies. The brainchild of **Frank Ehling** of AMA HQ, it was designed in an attempt to get a model that would pull the interest from plastic display kits, rockets and cars, and get beginners interested in flying models. It can be assembled by a 9-year-old in less than an hour, which means that kids at Scout meetings, 4-H, and so forth, can put one together in one meeting session. The kits (the current version is named "AMA Cub") are available at most hobby shops, and can be ordered in limited quantity from AMA HQ ($3 per dozen, plus 25 cents toward postage). Sponsors names can be imprinted on large orders from the manufacturer at no extra charge ($175 for 1,000 kits, details from AMA HQ), which means a club can get help in purchasing if the advertising angle is brought out. The Dart is the main reason there will be a Nats this year. The only contest in the past two years that impressed the Navy was the Delta Dart event!

The Endicott group is aiming at the **Cub Scouts,** the **Junior Deputies,** and at least one industry. The society has sent out information regarding the Dart program to these groups, and so far has met with resounding success. The Cub Scout leaders within a 25-mile radius are being trained in the construction of the Dart, and in the administration of the contests. Winners in



Aeroguidance Society member Mike Bishop explains the AMA Cub version of the "Delta Dart" to Edwin Crawford, an official of New York's Broome County, and several Cub Scouts. In addition to Delta Dart programs, the club's Project Concern involves lecturing, demonstrations and displays.

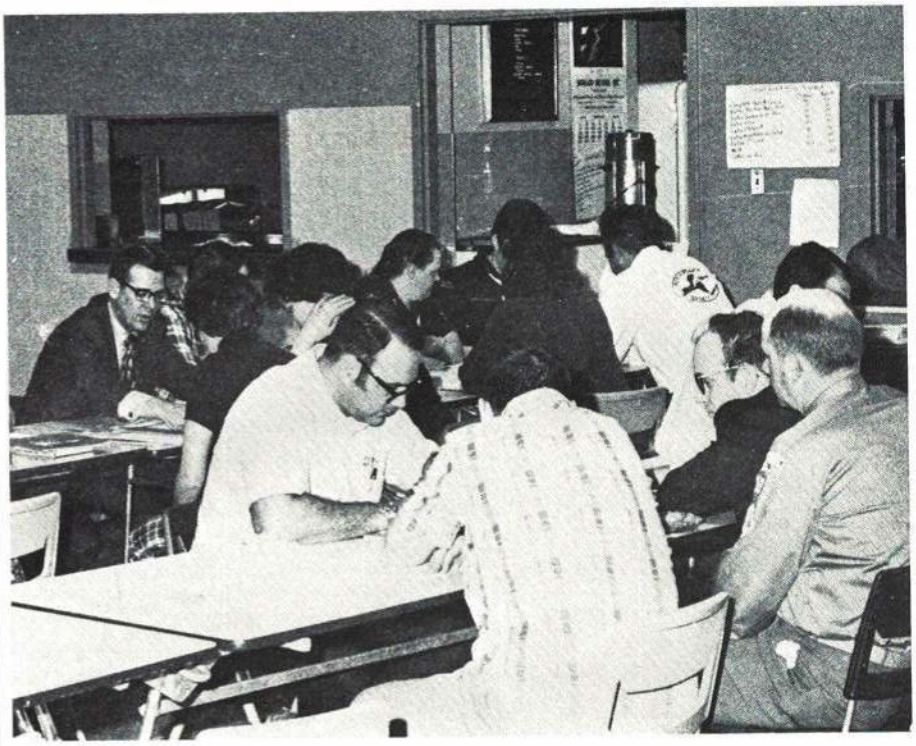
each den will have a district fly-off, with the winners in each age group meeting at the annual RC contest in August. The club provides the kits at slightly above cost — each one emblazoned with the Aeroguidance emblem.

The Junior Deputy program is set up a little differently. The sheriff will distribute the kits at the annual picnic, and then the deputies will assist in construction, having been trained by members of the RC club. Contests will be held in various areas throughout the county, with the winners eligible to compete in August. In future years it is likely that the sheriff 's program will be set up somewhat similar to the Cub Scouts, with the sheriff purchasing the kits and providing the instructions.

The other outlet is **Link Aviation,** where several of the club members are employed. They have prevailed upon the management to allow a contest for the children of employees, with any and all participating. Again, those eligible will be welcome at the RC championships.

. . . Mr. Longeron had not flown a model for the last 15 years. His community had obtained an injunction after he buzzed the church on Sunday morning, chased the neighborhood kids with a bull-whip, and punched the owner of the flying field when he complained about the litter and tire marks through his garden.

How does the effort of the Aeroguidance Society differ from the course followed by Ol' Orvy? Initially, and most important, is the fact that nearly every kid in this part of the state will be put in some kind of contact with a model airplane that is easy to build, and really flies. Secondly, the guys from Endicott will be seen as responsible, interested members of the community instead of a bunch of grown men playing with toys. Once the model airplane is seen as a tool of education and research as well as an item of pleasure, there will be a reduction in the animosity toward the hobby and those who pursue it. In addition, it will be much harder for someone to complain if his own son is a modeler as a result of the efforts of the club. Besides these advances in community relations, there are other more tangible rewards. The first of these, as far as the Endicott club was concerned, occurred when they agreed to assist the sheriff. In the conversation it was mentioned that their flying site was being sold due to pressure from the nearby homeowners, and that a new site was difficult to locate. The sheriff offered to assist by seeing if any county land was available for sale or lease, and by having his men keep their eyes open for possibilities. He further offered to provide men for traffic and crowd control at the August contest, a problem that has plagued many Contest Directors. Not mentioned, but surely a benefit, is the fact that future complaints about the noise of model aircraft will be handled in a more sociable manner.



Bob Noll, Aeroguidance member and AMA Dist. II RC Contest Board member, instructs Cub Scout leaders in the construction of the Delta Dart; they in turn will instruct Cubs in local dens. Spreading the load has the advantage of getting non-modeling adults familiar with modeling.

So there is the story of one club that has recognized the problem, and hopefully has found the answer. The more people who come in contact with model aviation, the more who are likely to look on such activity with favor. This is especially true if the parents can see the benefits to be derived by their children — benefits that range all the way from simply giving them something to do to stay out of trouble, up to opening the way for a future career. Also, how is a club to know that the kid who gets hooked on the Dart might not be the son of one very grateful landowner who would happily provide all the flying space you'd ever need? Sure, this is wild guessing — but still a possibility.

Disregarding the possibilities and sticking with the sure things, **if you are really interested in helping kids get started in a great hobby, improving the image of your club, establishing favorable relations with the public, and performing a service to your community, there is a way.** The AMA Junior Committee will be happy to provide any form of assistance in getting a Dart program started, setting up a lecture and demonstration group, or a lesson plan for teachers who want to include an aviation unit built around the Dart. These materials may be obtained by contacting AMA HQ, 806 Fifteenth St., N. W., Washington, D. C. 20005. The only thing asked in return is that you send in a report on the success of your efforts, so that it can be passed on to others.

It is up to the members of the hobby to do what they can to get more people interested, whether as active participants or as sympathetic observers. After all, an increase in numbers will be accompanied by an increase in the productivity of the manufacturers, the recognition by the powers-that-be of the need for recreational flying sites, and a more general acceptance of modeling and those who practice it. The door *can* be opened, and the key is here . . . it's called the Delta Dart.

Hardy Brodersen photo

Delta Darting is going on all over the country. Picture sequence was in conjunction with the 32nd Annual Michigan State Indoor Meet last May. Dart kits were available at the contest — youngsters were invited to come and build them there. The youngster shown had a bad first flight, but the report is that his model kissed the ceiling during the third flight — obvious from the pleased facial expression.

AMA News Bits

Paper Glider Meet

Anyone in the area of Columbus, Ohio, at the end of June and first part of July may want to look in on or take part in the international ADMIRE contest for paper gliders sponsored by *The Columbus Dispatch* newspaper and the Center of Science and Industry (of the Franklin County Historical Society). The all-paper airplanes will be judged for distance, duration, aerobatics and originality of design. All ages are eligible to compete (various classes according to age), and there will be special categories for doctors, lawyers, bankers, etc. ADMIRE, the name of the event, stands for Airplane Derby Means Interest, Research, Enjoyment.

Photo shows one of the first entrants in the ADMIRE contest, "The Schnoz," Jimmy Durante, with his paper model and two young admirers.

For more details contact Air Boss, *The Columbus Dispatch*, 34 South Third St., Columbus, Ohio 43216.

Candy Sale Big Success

Clubs needing to raise money for various projects should consider a candy sale if the success achieved by the AMA chartered Lansing Flying Aces (Mich.) is an indication of the general success which might be obtained. Writing in the club's *Newsletter*, Editor Dick Lape said that "The day after the sale started, club President Milt Stevens and I were both wishing that we had taken more candy to sell. Some people were even buying more than one bar. With this type of response by the public, the club should be able to expand this candy sale by a considerable amount next year."

"For anyone planning on a fund-raising drive, a candy sale like this is the way to go," said Lape, "but the candy should come from the World's Finest Candy Co. in Chicago." This company is reported to have provided excellent service.

CL Stunt Precedent?

That may be the result if a proposal before the Southern California Controline Association goes through. The association's *Newsletter*, edited by Lynn Bowman, reported that Bill Noyes brought up the subject of eliminating the appearance points at all association contests. Then Ron Duly suggested going another step by using the straight FAI Stunt rules (which do not judge for appearance). More discussion was to take place before final vote on this plan which, if adopted, might start a major trend.

Want a World Record?

A recent updating of the FAI World Records reminds us to say that new records for some of the categories may be had with models and capabilities well within the grasp of many AMA members. For instance Russia recently established a new World Distance Record for Powered Radio Control Seaplanes at 11.961 miles. Does that inspire you? See page 70 of the 1970 AMA Regulations for details on how to go about it

Gelatin to Fill Silk Pores

The Satellite, voice of the AMA chartered San Valeers MAC (Calif.), recently reported on a new Class B FF model by San Valeers President Tom Hutchinson. It's a ST 23-powered Galaxie 585 which was modified in various ways, including a rear rudder location. The model weighs but 20 ounces.

In the report by *Satellite* Editor Ralph Prey, what especially caught our eye was that Tom used Knox Gelatin for the first finish coat on the silk-covered wing, before applying dope. The idea, said to be an old trick from way back in ignition days, is to fill the pores with a light-weight material.

"Heinz" Mix for Good Microfilm

Following a discussion of various ingredients for making microfilm for covering indoor models, including a number of formulas, Bruce Edwards concluded with an interesting final word: "I have a large bottle into which I have been pouring the residue from each of my microfilm experiments. This "Heinz" mix has been giving me my best films." This gem was taken from *Free Flight News*, compiled and published in England by Ray Elliott, Ian Kaynes, John Lorimer and John Mabey.

Engine Mounting Tip

Sheet metal screws are excellent for mounting engines on hardwood runners, reports Buck Zehr of the AMA chartered Whirlwinds Club of Southwestern Michigan. He uses No. 6 x ¾" screws — says they work well, and the engine stays tight. This tip came from the club's monthly *Breeze*, edited by W. Hannah.

Muffler Evaluation Program

The AMA chartered Indian City Radio Control Club, Wyandotte, Mich., is going forward with its own muffler evaluation program, according to the club's paper, *Tom-Tom*, edited by Bob Mayhew. The club's Muffler Committee, headed by Ed Ellis, indicates that tests are proceeding with the club's sound level meter to establish noise values for different engines and mufflers. The tests will be an aid in establishing the maximum noise that any engine and muffler combination will be permitted to make at the club's field.

CL Preflight Check a Must

The difference between a successful flight and a prang or disqualification may well be whether an adequate preflight was first carried out, according to a tip by Matt McCloskey which was published in *Hanger Talk*, newsletter of the AMA chartered Cholla Choppers MAC, Tucson, Ariz.

McCloskey suggests the following checks. Are the spinner and prop on tight? Are all the engine bolts tight? Are the mounting bolts tight, and are the mounts solid and free from oil soaking? Is the fuel tank mounted solid, and is the filter clean? Are the wheels on straight with the collars on tight? Have you fixed that stress crack at the wing-body joint? Are the controls free? Check the leadouts and lines — any kinks should be suspect and should be cause for replacement. Last of all, hold leadouts and control surfaces, then shake plane. Anything bouncing around inside demands inspection. On the way out to the control handle for a flight, after getting a good engine setting, check the line connectors again to be sure they are closed. Run the lines out as you approach the handle. At the handle, check for up and down (many a plane has been lost from this little oversight). Finally, signal your helper to let go, and then put in a good safe flight.

Bob Reynolds is the current editor of *Hanger Talk*.

Prize/Event Dilemma Solved

Model airplane clubs of modest means often have wanted to offer a variety of events at their contests, but the expense of providing trophies often has been a limiting factor. A solution that the AMA chartered Model Airplane Club of Huntsville (Ala.) intends to try at its next FF meet is to award attractive medals with ribbons and engraving to third place in each event. The club's paper, *MACH News*, reasons that many of the contestants who have flown very much on the contest circuit already have more trophies than they have room to display.

The club is also considering providing jackets for wearing (which would be good for displaying the medals) to Junior, Senior and Open high-point winners. However, a problem which had not been resolved was how to obtain proper jacket size for the winners.

MACH News editor is Jim Perdue, AMA District V Vice-President, recent transplanted from Tullahoma, Tenn., to Athens, Ala.

Safety Advice

"We practice safety standards where we work and safety standards when we play," said Milt Stevens in the *Newsletter* of the AMA chartered Lansing Flying Aces (Mich.). "The same set of rules apply in every case," he said. "Watch what you are doing. Know exactly what you are doing. Use only good equipment, not something that is faulty." Some of our model airplanes can become lethal weapons if they are not treated with proper respect of their capabilities, he explained. "Stop and really think about it for a moment."

AMA, FCC Licenses a Must

The flying field of the AMA chartered Eugene R/C Aeronauts (Oregon) has a new sign which gives notice that use of the facility is restricted to paid up club members and their guests only. Guests must have AMA and FCC licenses (as is also required of members).

Reasoning behind this requirement is the liability insurance provided the club, the field owner and the individual flyer through AMA club charter and individual AMA membership. According to *Aeronaut's Chatter*, the club's monthly paper, "This field rule is not an attempt to pick on anyone or to restrict our sport to the 'in bunch'. It is just common sense and is for the safety and protection of all concerned."

Plugs FF Coupe D'Hiver

"Coupe is the ideal event with which to make the change from gas events to rubber events," said *SHOC Talk*, newsletter of the AMA chartered Sky Hoppers MAC of Orange County (Calif.). "The fact that your

Continued on page 62

Left: Sensation of the Nats Air Show was the simultaneous start and launch of FAI Team Race, Rat Race and Goodyear Race models on three circles. Don Jehlik coordinated the racing display and announced the goings-on to the crowd. **Below:** At the microphone Johnny Clemens from Dallas is introducing the Willow Grove NAS Commanding Officer, Capt. Brango (to right of Johnny), who in turn introduced Admiral Strean (to right of the Capt.). Admiral Strean and Miss Model Aviation, Chris Gorman, presented the Championship awards. Clemens, a member of the Nats Executive Committee, organized and MC'd the two-hour Air Show which featured most types of models.

PHOTOGRAPHS BY BILL COONS

'69 Nats Air Show—Preview for '70

The 1969 National Model Airplane Championships held at the Willow Grove Naval Air Station north of Philadelphia were climaxed by a two-hour Air Show and Awards Presentation on Sunday afternoon, July 20th.

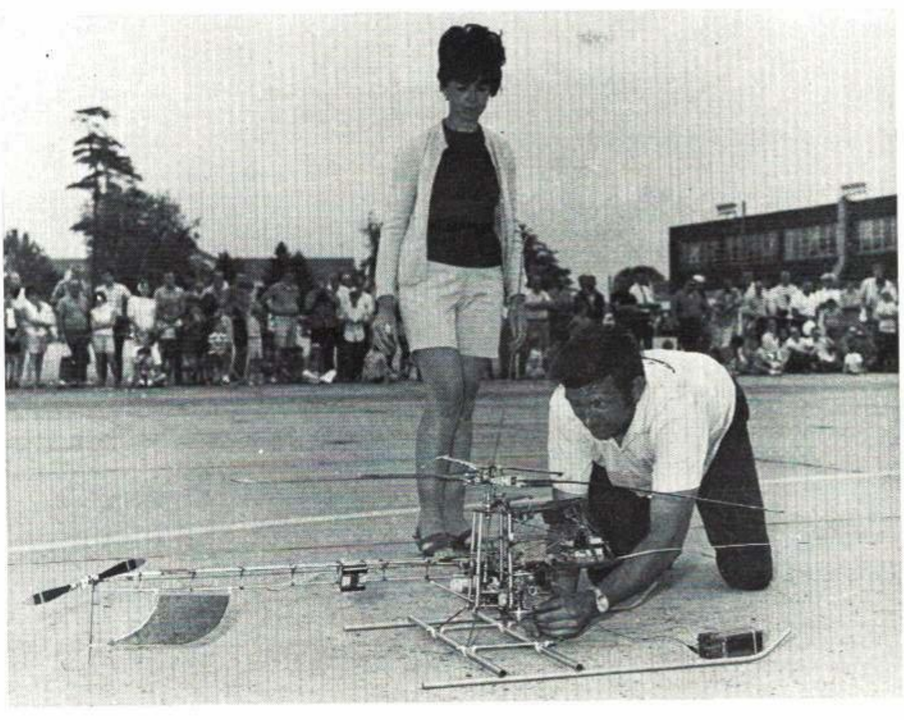
Included in the Air Show were demonstrations of every possible type of model aircraft that could be safely flown before the huge crowd of spectators and distinguished guests.

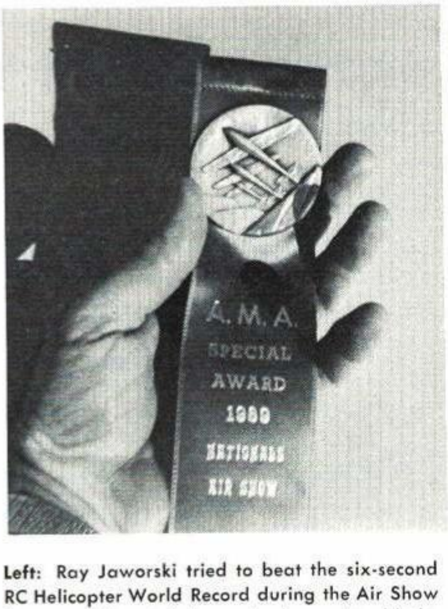
Participants in the Air Show were chosen from among the winners in the competition events which had been flown the previous week. This was the largest and most diversified model airplane demonstration ever put on, with crowd pleasers from such events as Control Line Stunt, Racing and Scale categories; Gas and Rubber-Powered Free Flight; Radio Control Pattern, Scale, Soaring Glider; plus novelty flights. It even included a World Record Helicopter RC attempt.

The Navy hosts added dignity and prestige in awarding of our National Championship Trophies, and voiced their amazement at what they saw done with model airplanes.

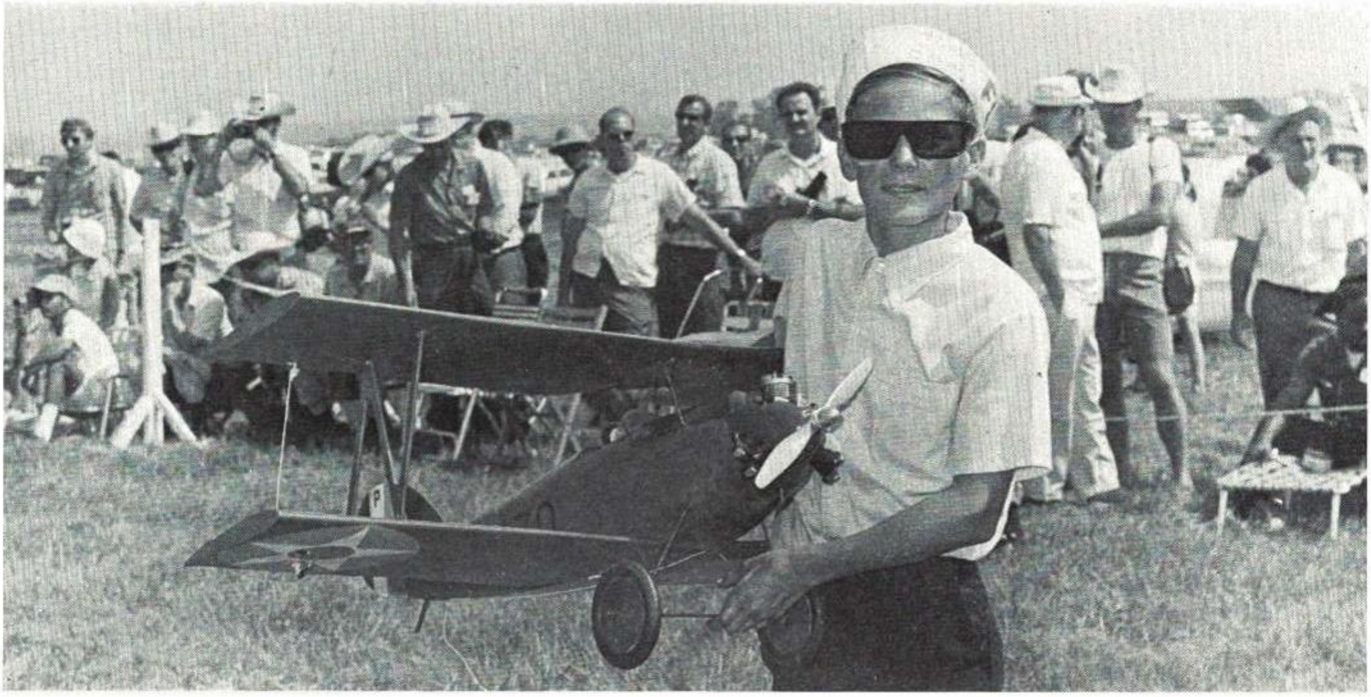
A fitting climax to such a grand affair was the salute to our astronauts by the entire crowd listening to the landing on the moon by the astronauts over the public address system.

This was very timely, because Astronaut Neil Armstrong, the first man to set foot on the moon, had been invited to be Guest of Honor for the Air Show, but had to put in his appearance on the moon instead of our VIP stand. It was possible, however, to announce that Neil Armstrong had started his career by flying model airplanes. A great Air Show!

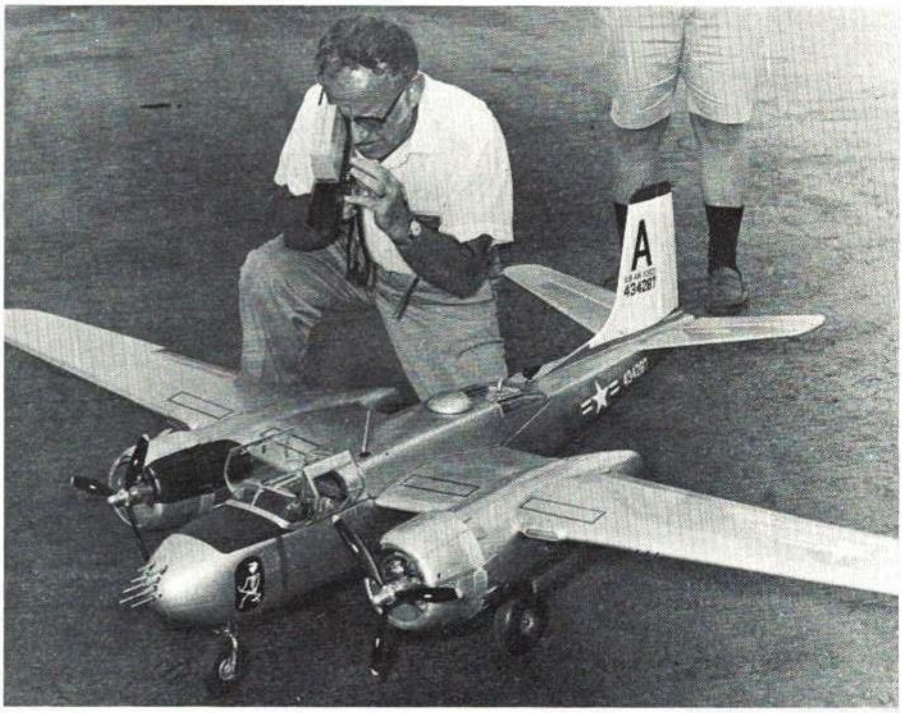




Left: Ray Jaworski tried to beat the six-second RC Helicopter World Record during the Air Show but was thwarted by a broken rotor blade. **Above:** Well received gesture of appreciation to all Air Show participants was the presentation by Miss Model Aviation of the medals shown.



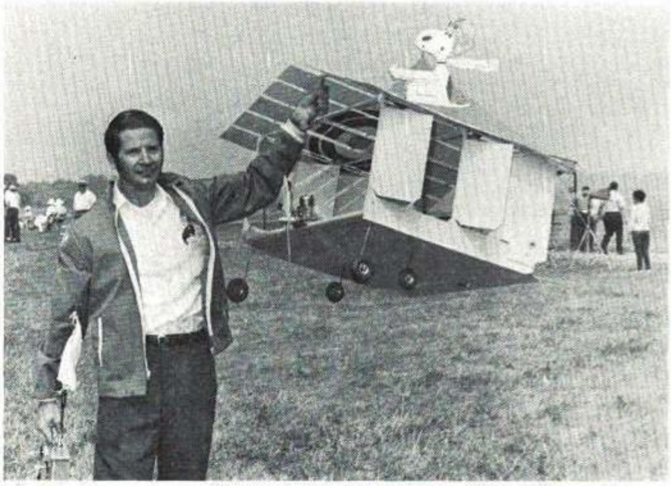
Above: Jimmy Hiller, 12 years old, from Hickory Hills, Ill., with his RC Scale Messenger, was the youngest flyer in the Air Show, but you would never know it from his polished exhibition.

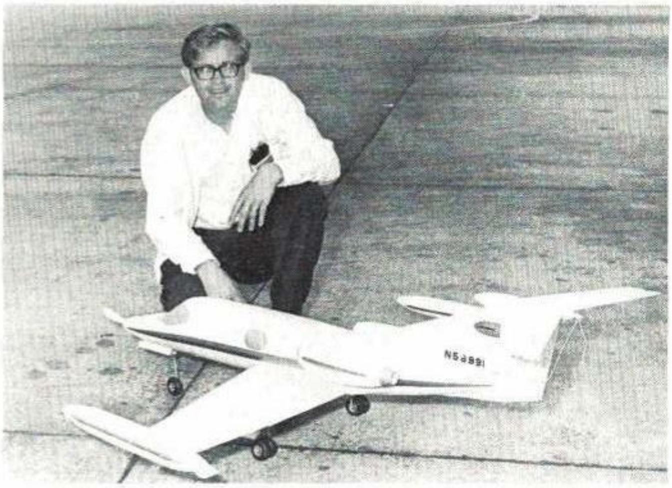


Right: This superbly detailed B-26 Invader won first in Senior CL Flying Scale for James Romano, 19, from Woodhaven, N. Y., who then made an exhibition flight for the crowd at the Air Show. The model here is being recorded on film for the AMA 1969 Nats movie by Johnny Clemens. The movie is available to AMA chartered clubs from AMA HQ.

Below: Always a terrific crowd pleaser is Snoopy's Dog House by Al Signorino of Bridgeton, Mo. His flying demonstration amazed and amused one and all.

Below, Right: Jerry Nelson, San Ramon, Calif., made a beautifully smooth demonstration flight with this RC Lear Jet borrowed from Sherlock Models. Jerry was the only two-flight performer in the Air Show. He also flew his huge RC soarer with a launch assist from Sam Crawford and a gasoline engine-powered winch.





AMA News Bits

Continued from page 59

average Coupe is such a small airplane makes it quick to build, easy to handle, and inexpensive all around. Some of the not-so-sweepstakes types have built Coupes just to have something to fill in the lull on Saturday afternoons, then there are the sweepstakes fliers who will build one and fly it as a mismatched Unlimited," said the paper edited by Paul Ryan.

"A competitive Coupe can usually be built from those half-used sheets of wood that are always on, around, or under your workbench. Add a folding prop, a little bit of rubber, and you've got another one of the Wee Gumbanders!"

FF Turmoil at Sepulveda

Free Flighters face the possibility of being banned from flying in Sepulveda Basin near Los Angeles, according to a report by **Tom Hutchinson** in *The Satellite*. Hutchinson currently is president of the **AMA chartered San Valeers Model Airplane Club.**

Forces of the **Los Angeles Model Hobby Association** were being organized to support continued FF use of Sepulveda. According to the report, it was thought that use of small field rules, with two or three minute max flights, would be important to continued use of the area.

Fast Way for Club Communications

The cancellation on short notice of an event of the **AMA chartered New England Radio Control Modelers** created a crisis which **John Ross** (AMA Dist. I Associate VP) hopes to avoid in the future. He proposes that the club treasurer draw up lists of club names and telephone numbers to be assigned to key club members. In the event of a future crisis requiring notification of club members in a short time span, each member of the club's board would telephone about five of the key members (with phone lists) who would, in turn, notify a handful of club members in their immediate area. This chain-letter principle, employed by the Wellesly schools in which John's wife teaches, would result in fast communication with a minimum of telephoning by any one member. Judicious assignment of phone quotas would minimize the number of toll calls any one board member would have to make.

Scale Snow Conditions

A recent issue of *Tom-Tom*, newsletter of the **AMA chartered Indian City Radio Control Club,** relates the problems **Gerry Skrycki** had when he, with help from **Jim Hammons,** attempted to get his RC model into the air from a snow takeoff with skis. It was to no avail, said the newsletter. The snow was dry, powdery and about ten inches deep. The plane settled far into the snow each time a takeoff run was tried. *Tom-Tom* Editor **Bob Mayhew** tried a ski takeoff about a week later and had the same problem. "I am convinced," said Mayhew, "that ten inches of soft snow does not present a scale condition for our models. I'm waiting," he went on, "for the day when there is one inch of fresh snow to try my skis again."

18-Flight Coupe D'Hiver Record

John Lenderman, St. Helens, Ore., had a real marathon race going when he set his Open age class FF Coupe D'Hiver rubber model record last January. The Coupe rules call for five 2-minute flights, then a continuation of 2-min. flights when the first five are all maxes, until one is missed. As a result, Lenderman's 36-minute National AMA Record consists of 18 2-min. maxes!

According to *WMC Patter*, published by the **AMA chartered Willamette Modelers Club,** Oregon, "There would have been no problem for John to have continued nearly indefinitely had the weather not deteriorated or darkness fallen."

TWA Youth Program Contribution

Thanks to the efforts of a good AMA member from California who flew to the Tucson Winter Nats via **Trans World Airlines** and persuaded TWA to make a contribution, the **AMA Youth Program Fund** is now $100 richer. We'd like to see other airlines follow TWA's lead. After all, many a pilot, navigator and mechanic has come from the ranks of modelers.

N. Y. Scale Classes

The first of what is planned to be a series of meetings to promote scale modeling in the New York area was held last December. **John Condon** and **Bill Boss** led that discussion, and it is expected that they will lead additional informal lectures on scale covering, building, flying, rules, how and where to obtain information on scale detail, etc. Condon is newly appointed to the AMA Scale Advisory Committee from AMA District II, and Boss is AMA VP for the district.

Any AMA member who may be interested in attending future meetings should contact Bill Boss, 145-24 223rd Street, Laurelton, N. Y. 11413.

Gyrogliders in Europe

The **Bensen Aircraft Corp** and AMA teamed up recently to help the Romanian model federation. A request from the aeromodeling delegate of that country to the U. S. delegate, at the last annual meeting of the **Federation Aeronautique Internationale,** made known the desire of Romanian officials to build gyrogliders as a state project for youth. When advised of the request through AMA, **Dr. Igor Bensen,** Gyroglider designer and manufacturer, provided plans and instructions without charge. Personal delivery was made by the U. S. team manager at the Indoor World Championships last April. For information about Gyrogliders in the U. S., write to: Bensen Aircraft Corp., Raleigh-Durham Airport, Raleigh, N. C. 27602.

Fifteen-Year-Old Pattern Expert

By winning third place in Novice Class C Pattern at the Phoenix contest last February, **Whit Sockwell,** 15, Encino, Calif., flew himself right into the Expert category. Previously Whit had been named 1969 winner of the **National Miniature Pylon Racing Assn.** Grand Championship award. Quite a record!

Dist. XI Meeting

Forty-five AMA members from 14 different clubs attended the January 17 meeting organized by **AMA VP Bob Stalick.** This provided opportunity for club representatives and modelers to discuss with AMA officials the various national, regional and local programs in which they were interested.

In addition to reports on the AMA-HIAA-Navy Program, Contest Board activities (discussed by Dist. XI CB Members **Dr. Ralph Brooke, Keith Loutocky** and **John Lenderman**), contest coordinating (discussed by Contest Coordinator **Al Grell**), there were numerous items from the floor. There was, also, a report from the **Washington Air National Guard** on current planning for the **Spokane Internats,** and a report from **Bud Nelson** about a **Boeing Management Assn. Model Aeronautics Scholarship Contest** which was held June 20-21. For Juniors and Seniors only, a $1500 scholarship went to the winner.

HL Glider Seminar

Twenty **Cub Scouts** gathered in the home of **Milt Webb** last January to participate in a model glider seminar conducted by the **AMA chartered Miniature Aircraft Radio Kontrol Society,** San Bernardino, Calif. According to the club's *News Letter* edited by **Betty Auman,** each of the Scouts built their own HL glider from scratch and then participated in a distance contest at a nearby parking lot. One youngster was heartbroken when he lost his glider in oleander bushes, but he borrowed another glider for the contest. This was the first attempt of the MARKS Club to directly aid youngsters in modeling. Six club members helped with the program: **Greg Auman, Howard Sears, Joe McGinnis, Larry Eastman** and **Mike Bryan.** The club now plans additional seminars around the AMA Cub rubber model.

Penn State Cub Meet

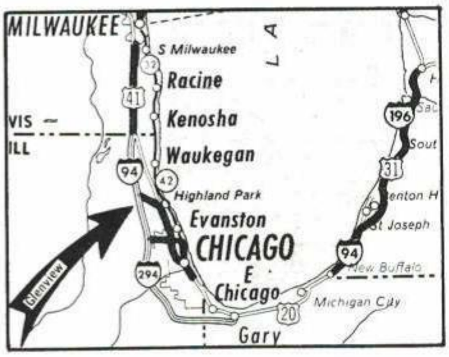
Photo submitted by Dan Rodgers

Photo shows winners of the AMA Cub rubber model contest put on earlier this year by the **Penn State Model Airplane Club.** Over 190 entrants flew in the contest in three age brackets: 0-10, 11-13 and 14-16.

From a budget of nothing, the club was able to provide nine trophies plus kits for prizes (plus a new CO_2 engine donated by **Bill Brown,** who lives nearby) and emerge with a profit of $9.30. The club's advisor, **Roger Arndt** of the Penn State Aerospace Dept., advanced the group money for 500 Cub kits which were then sold to local Scouts and townspeople for slightly above cost.

The **AMA chartered Science Park Aero RC Club** aided in the operation of the contest and provided static displays. The overall event was so successful that the local recreation department has said that it will fund 1,000 kits and provide awards for another contest. Good going!

Information about obtaining AMA Cub kits in quantity (1,000 for $175) is available from AMA HQ. When ordered in a unit of at least 1,000, the kits may be printed with the sponsor's message on the wing covering.



Only a short while remains before the beginning of the 1970 National Model Airplane Championships at Glenview Naval Air Station, Ill., July 27-August 2. Entry forms still available from AMA HQ, but if they were not postmarked by June 22 they must be presented in person at Glenview NAS on Monday (only), July 27, from 2 pm to 5 pm or from 7 pm to 9 pm. Even if you don't compete you are invited to watch all week long — free admission.

AMA News Extra . . . . .

COMPETITION RULES NOW BEING REVIEWED

The AMA Contest Boards are slated to meet during the National Contest (N.A.S. Glenview, Ill., July 27-August 2) to thrash out in person various proposals for changing AMA competition and record rules. The proposed changes, submitted by AMA members, if adopted, will be effective January 1, 1971.

There are three Contest Boards, one for each of the major modeling categories: Radio Control, Free Flight and Control Line. Each board operates independently when the proposal relates only to its category, but the boards operate on a combined basis when the subject matter affects all interests. Each board is comprised of 11 regionally distributed modelers who are expert in their respective categories and who are appointed by their elected District Vice-Presidents--33 volunteers working to create rules to the liking of the majority of AMA members.

By means of the AMA Competition Newsletter provided to over 500 AMA chartered clubs and nearly 3,000 subscribers, many AMA members will have already seen outlines of the proposals and, hopefully, will have been in touch with their district CB members to express their opinions, pro or con. Since it is not possible to print here the detailed proposals the boards will act upon, it is suggested that interested modelers contact the nearest AMA chartered club for details (see listing beginning on page 83 of the 1970 Model Aircraft Regulations) and then correspond with the Contest Board member for your category and district--listing on page 64 of this issue. A brief summary of the proposals and items expected to be on the Nats agendas of the Contest Boards:

RADIO CONTROL

Pattern. A review of subcommittee recommendations for revising the system of skill divisions, with the primary purposes being to prevent loss of interest because of too rapid progress into a higher class and to prevent the "hardware hunter" from hovering just outside the top position at every contest. Also, to review and clarify any rules which have been subject to misinterpretation.

Pylon. A review of Sport and Open Pylon racing interest with the view of developing rules to regulate activity in a manner satisfactory to the majority of AMA members. For Formula I and II, to clarify interpretation of some troublesome rules.

Scale. A review of the current prefab fuselage rule and other prefab components.

Soaring. Board members are expected to observe the Nats Unofficial Soaring Competition and to consider the rules used for this event and others previously proposed.

FAI Provisional Categories. The board expects to summarize and transmit to the FAI RC Subcommittee the various reports it has received as a result of tryouts of the FAI Provisional Pylon and Gliding rules.

FREE FLIGHT

General. To establish new policies for revising national records: to eliminate records periodically, to retain a record when there is a rule change if the model and flight would meet the new conditions. To establish categories of competitions and records so that both small and large flying fields could be used effectively.

Outdoor HL Glider. To revise the number of flights scored and to revise the flyoff system.

Unlimited Rubber. To revise the flyoff system.

Gas. To create a Provisional class which would allow use of a "tuned pipe".

Payload Gas and Payload Cargo. To change the titles to "Payload and "Cargo."

CONTROL LINE

General. To tailor pull-tests and minimum wire sizes (separate minimums for solid and stranded) for each category and class, rather than have various categories refer back to Speed rules.

Speed. To permit commerical ready-to-fly models in ½A Speed and ½A Proto Speed. Also, for Open age flyers, to permit the builder entrant to be either the pilot or engine starter.

Dive Bombing & Strafing. To increase the number of flights to three, specify shorter lines for .19 engines, revise the Bonus Point breakdown, and reduce the Barrier Pole height to six feet.

Scale Racing (Goodyear). To create a second class which would have a fuel capacity restriction, and to require the control handle to be held at the pilot's chest to restrict whipping.

Navy Carrier. To modify the throttle interpretation for Profile, to specify the point on the "deck" where the takeoff must begin for all classes, and to revise the definition of Class I and II models eligible for Bonus Points.

Combat. To require the pit crew to do all engine starting and for the pilot, throughout the start and flight, to remain in the center of the circle.

Stunt. Various proposals call for Supplemental Junior and Senior events with simplified maneuver schedules; a new class limited to uncowled .359 engines in which static points would be only for workmanship; new Classes A, B, C and Expert, with age class and proficiency determining the class to be entered and with maneuvers and static scoring differing with each class; to eliminate appearance points entirely; to require two laps between maneuvers; and to permit entry of two models.

Rat Racing. To create a second class for front rotor. 36 max engines with requirements for prop, landing gear, wing, fuselage, stabilizer and fin.

By special arrangement with the publisher this page is produced at the very last minute, just before the magazine is printed, to bring you the latest news concerning current Academy of Model Aeronautics events of national significance.

DIRECTORY OF AMA OFFICERS

Which officers live in your district? Select correct address when writing officers.

EXECUTIVE COUNCIL

President:
John Patton, Route #5, Frederick, Md. 21701
Secretary-Treasurer:
Earl Witt, Longview Trailer Court, R.D. #3, Chambersburg, Pa.
Executive Director
John Worth, c/o AMA Hq., Shoreham Bldg., 806-15th St., N.W., Washington, D. C. 20005
Vice Presidents
I: Cliff Piper, 391 Elm St., Pittsfield, Mass.
II: Wm. Boss, 145-24 223rd St., Laurelton, N. Y. 11413
III. Ron Morgan, School for Vet Children, Scotland, Pa.
IV: C. Telford, 8612 Rayburn Rd., Bethesda, Md.
V: J. Perdue, 111 Christopher Ave., Athens, Ala. 35611
VI: Gosta Johnson, 6810 S. Crandon, Chicago, Ill.
VII: Jack Josaitis, 23663 Lawrence, Dearborn, Mich. 48128
VIII: William Lank, 3143 Rotan Ln., Dallas, Tex. 75229
IX: Stan Chilton, 446 Ida, Wichita, Kans.
X: Vic Cunnyngham, Sr., 4337 Hornbrook St., Baldwin Park, Calif. 91706
XI: R. D. Stalick, 2807 S. Oak St., Albany, Ore.

CONTEST COORDINATORS:

I: Elvin Bowe, 101 S. Riverview, Haverhill, Mass. 01830
II: E. F. Hoffman, 158 Carpenter St., Belleville, N. J.
III: Ken Reber, Rt. #2, Shippensburg, Pa. 17257 (East)
M. Weisenbach, 4568 West 146th St., Cleveland, Ohio 44135 (West)
IV: D. L. Johnson, 3367 Sudlersville So., Laurel, Md.
V: T. McLaughlan, 4140 Fern Ct., Pine Glades, Pensacola, Fla. 32503
VI: Whalon Webb, 15722 Vine Ave., Harvey, Ill. 60426
RC: Al Signorino, 11959 Glenvalley Dr., Bridgeton, Mo.
VII: Odell Marchant, 2004 N. Hillsboro, Minneapolis, Minn. 55427 (North)
W. Hartung, 14759 Kilbourne, Detroit, Mich. 48213 (South)
VIII: M. Frank, 2933 Blankenship, Wichita Falls, Tex. 76308
IX: R. R. Combs, RR #1 Box 712, Morrison, Colo.
X: D. C. Farnsworth, 301 Carl Dr., Visalia, Calif. 93277 (North)
Lee Polansky, 865W Huntington-1 Arcadia, Calif. 91006 (South)
XI: A. L. Grell, Rt. 1 Box 165, Tangent, Ore. 97389

CONTEST BOARD COORDINATOR: Don Lindley, 301 E. Elizabeth Dr., Crown Point, Ind. 46307

Bold type below indicates Chairman of Contest Board.

FREE FLIGHT CONTEST BOARD:

I: Henry Struck, R.F.D. #2, Hamburg, Old Lyme, Conn.
II: E. Fronczek, 34-14 Broadway, Long Island City, N. Y. 11106
III: Floyd Miller, 1313 Brookridge Dr., Columbus, Ohio 43220
IV: J. V. Boyle Jr., 219 Shenandoah Rd., Hampton, Va. 23361
V: G. C. Pickel, 1631 Steen Dr., Clarksdale, Miss. 38614
VI: Chuck Borneman, 1401 W. Taylor, Kokomo, Indiana 46901
VII: P. W. Klintworth Jr., 27701 Lenox, Apt. 202 Madison Hts., Mich. 48071
VIII: Buzz Averill, 2314 Palomas Dr., N.E., Albuquerque, N. Mex. 87110
IX: Frank Monts, 6519 Marjorie Lane, Wichita, Kans.
X: John Pond, 4135 Avati Ave., San Diego, Calif. 92117
XI: J. Lenderman, Route 2, Box 460, St. Helens, Ore.

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I: J. Ennis, 165 Grafton St., Brockton, Mass. 02401
II: J. G. Pailet, 30 Emerson Rd., Brookville, Glen Head, N. Y. 11545
III: Laird Jackson, 523 Meadowbrook, St. Davids, Pa. 19087
IV: Wm. Pardue, 1407 Gracewood Dr., Greensboro, N. C.
V: W. D. McGraw, 1325 Carol Dr., Memphis, Tenn.
VI: Arthur J. Johnson, 1818 Oslo Drive, Rockford, Ill. 61108
VII: Arthur Adamisin, 22454 Fairfax, Taylor, Mich. 48180
VIII: Leland Morton, 8614 Triton, Dallas, Texas 75227
IX: J. R. Mason, 2214 S. Pine Crest, Wichita, Kans.
X: P. Brandt, 5817 W. Ironwood, Palos Verdes Peninsula, Calif. 90274
XI: Keith Loutocky, 1419 S. 48th, Tacoma, Wash.

RADIO CONTROL CONTEST BOARD:

I: H. A. Thomasian, 369 Brigham St., Northboro, Mass. 01532
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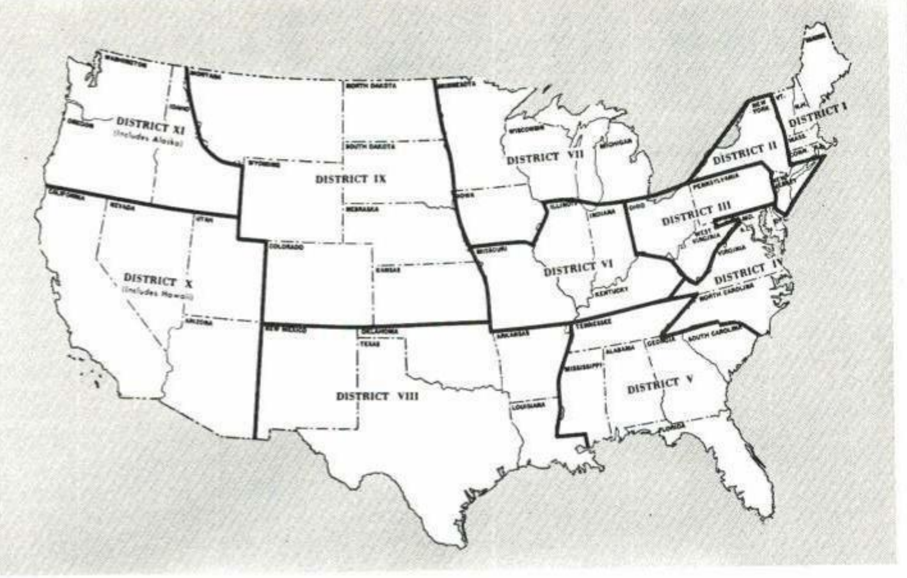
III: Howard Grogan, 1326 Wakeling St., Philadelphia, Pa.
IV: G. Hill, 4106 Breezewood Ln., Annandale, Va. 22003
V: Herbert Davis, 3800 River Oaks Rd., Birmingham, Ala. 35243
VI: Bud Atkinson, 734 North 6th St. Terr., Blue Springs, Mo. 64015
VII: Peter Waters, 31219 Kendall, Livonia, Mich. 48154
VIII: Wm. A. Knost, 6914 E. Admiral Pl., Tulsa, Okla.
IX: Loren Tregellas, 3003 S. Everett, Wichita, Kans.
X: W. C. Northrop, Jr., 9542 Hightide Dr., Huntington Beach, Calif. 92646
XI: R. Brooke, 3431 S. 194th, Seattle, Wash. 98188.



HOW TO USE THIS AMA DIRECTORY

Over 150 AMA members serve as volunteers on various committees which determine operating policies of Academy activities — many are listed here. Members are invited to communicate their comments, suggestions, proposals, or complaints by writing to the appropriate committee at any time. Note that the Executive Council and Associate Vice Presidents represent area interests for general AMA policy matters. Wherever district numbers are shown, write to the nearest address for your area. It is recommended that a copy of any correspondence be sent also to AMA Headquarters.

ASSOCIATE VICE PRESIDENTS:

I: J. Ross, 19 Sterling Dr., Dover, Mass. 02030
II: A. Schroeder, 18 Spencer Rd., Glen Ridge, N.J.; J. Moynihan, 123 Evergreen Dr., Tonawanda, N. Y.
III: R. DeLaVeaux, 1316 Gilham, Philadelphia, Pa.; R. Pennetti, 3918 Brandon Rd., Pittsburgh, Pa.; A. Seidowski, 21460 Sheldon Rd., Brookpark, O.
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Junior Committee: Ed Abram, Ouaguaga, N. Y. 13826

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L. Peters, 3025 Hillglen Rd., Dallas, Tex. 75228
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John Worth, c/o AMA Hq., Shoreham Bldg., 806-15th St., N.W., Washington, D. C. 20005

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FF: D. Linstrum, 12 Holcomb St., Simsbury, Conn.
Scale: L. Weber, P. O. Box 355, Rio Vista, Calif.
Rockets: G. H. Stine, 127 Bickford Ln., New Canaan, Conn. 06840

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CL: L. Jackson, 523 Meadowbrook, St. Davids, Pa.
FF: D. Linstrum, 1 Holcomb St., Simsbury, Conn.
Ind: C. Mather, 3860 Echochee Ave., San Diego, Calif.
RC: T. Rankin, Team Selection Comm. Chmn. 9410 N. Penfield Rd., Ellicott City, Md. 21043

RC FREQUENCY COMMITTEE:

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H. McEntee, 490 Fairfield Ave., Ridgewood, N. J.
J. Phelps, 1 Foxberry Ln., Liverpool, N. Y. 13088
P. Runge, 1107 Main St., Higginsville, Mo. 64037

Fly Safely!

Follow AMA Rules

CONTEST CALENDAR

Official Sanctioned Contests of the Academy of Model Aeronautics

July 4 — Washington, D. C. (AA) Fairfax Model Associates Annual CL Contest. Site: Bolling Air Force Base. T. Palmer CD, 10635 Ashby Pl., Fairfax, Va. 22030. Sponsor: **Fairfax Model Associates.**

July 4 — Vineland, N. J. (AA) 4th Annual 4th of July CL Meet. Site: Landis Park. P. Haley CD, Braddock Ave., RFD 5, Hammonton, N. J. 08037. Sponsor: **South Jersey Aeromodelers.**

July 4-5 — Ayer, Mass. (AAA) Yankee FF Championships. Site: Ft. Devens. R. Harlan CD, 15 Happy Hollow Rd., Wayland, Mass. 01778.

July 4-5 — Sebring, Fla. (AAA) Confederate FF & CL Nats. Site: Sebring Air Terminal. R. Myers CD, 3935 SW 125th Ave., Miami, Fla. 33165.

July 5 — Mentor, Oh. (AA) MARCS All RC Pylon Day. Site: Club Field. F. Vidmar CD, 26500 Zeman Ave., Euclid, Oh. 44132.

July 5 — Brighton, Wisc. (AA) 10th Annual I. M. A. C. Invitational FF FAI Contest. Site: Bong Field. P. Sotich CD, 3851 W. 62nd Pl., Chicago, Ill. 60629. Sponsor: **Illinois Model Aero Club.**

July 11-12 — Tullahoma, Tenn. (AA) III Annual RC Meets. Site: Airfoilers Field. J. Robinson CD, Route No. 1, Tullahoma, Tenn. 37388. Sponsor: **Coffee Airfoilers.**

July 11-12 — Oaks Corners, N. Y. Sky Rovers Hobo RC Fly for Fun Meet. Site: Club Field. H. Ford CD, 11 Stephens St., Clifton Springs, N. Y. 14432.

July 11-12 — Oklahoma City, Okla. (AAA) Sooner State Model Aviation FF & CL Championships. Site: North Western & Memorial Rd. F. Miller CD, 1900 Rolling Ridge, Bethany, Okla. 73008.

July 12 — Hadley, Mass. (AA) Hampshire Showdown RC Air Races. Site: ¼ Mile N. of Coolidge Bridge. R. Barkowski CD, 32 Lyman St., Easthampton, Mass. 01027. Sponsor: **Hampshire County Radio Controllers.**

July 12 — Marysville, Oh. (AA) Paa-Load Cargo-Rubber Cargo FF Competition. Site: Lee Farm & Airstrip. W. Chambers CD, 3041 Atwood Terr., Columbus, Oh. 43224. Sponsor: **Central Ohio Free Flight Club.**

July 12 — San Bernardino, Calif. (A-Entry Restricted). MARKS Glider RC Fly. Site: San Bernardino. P. Rawlings CD, 27621 Foster Ave., Highland, Calif. 92346. Sponsor: **Miniature Aircraft Radio Kontrol Society.**

July 12 — Seattle, Wash. (AA) North West CL Combat Championships. Site: Carkeek Park. D. McKay CD, 2222 Gilman Dr., W., Seattle, Wash. 98119.

July 12 — Ohio City, Oh. (A) RC Club Contest. Site: D. Kraner CD, RR No. 1, Ohio City, Oh. 45874. Sponsor: **SHOO Flyers MAC, Inc.**

July 12 — Columbus, Oh. (AA) 5th Annual Northland CL Championships. Site: Northland Shopping Center. C. Hemmerly CD, 5607 Sandalwood Blvd., Columbus, Oh. 43229. Sponsor: **Capital City Controliners.**

July 12 — Davenport, Iowa (AA) 13th Annual CL Model Airplane Meet. Site: Davenport Airport. R. Mairet CD, 3009 Westmar Dr., Bettendorf, Iowa 52722. Sponsor: **Davenport MAC.**

July 12 — Hastings, Minn. (AA) MMAC Summer FF Meet. Site: Webers Airstrip. H. Langevin CD, 4854 Aldrich Ave., S. Minneapolis, Minn. 55407. Sponsor: **Minneapolis Model Aero Club.**

July 18-19 — Napa, Calif. (AA) Napa All Speed CL Day. Site: Kennedy Park. J. Imboden CD, 906 Naples St., San Francisco, Calif. 94112. Sponsor: **Napa Air Phantoms Assn., Inc.**

July 18-19 — E. Meadow, L.I., N.Y. (AA) 3rd Annual Nassau Aero Guidance Society RC Meet. Site: Mitchell Field. H. Goldklank CD, 49 Ave. "O", Brooklyn, N. Y. 11204.

July 18-19 — Marshall, Tex. (AA) Northern Texas

Continued on page 87

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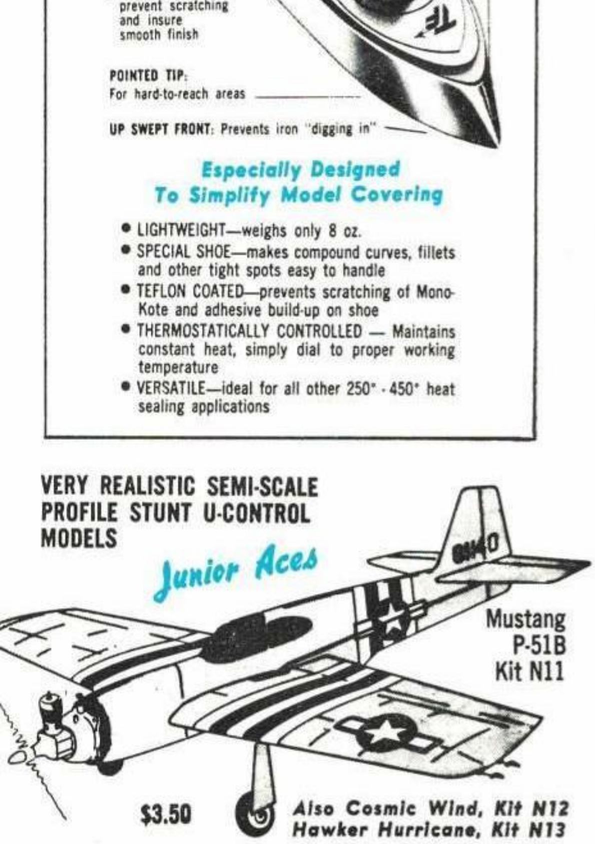

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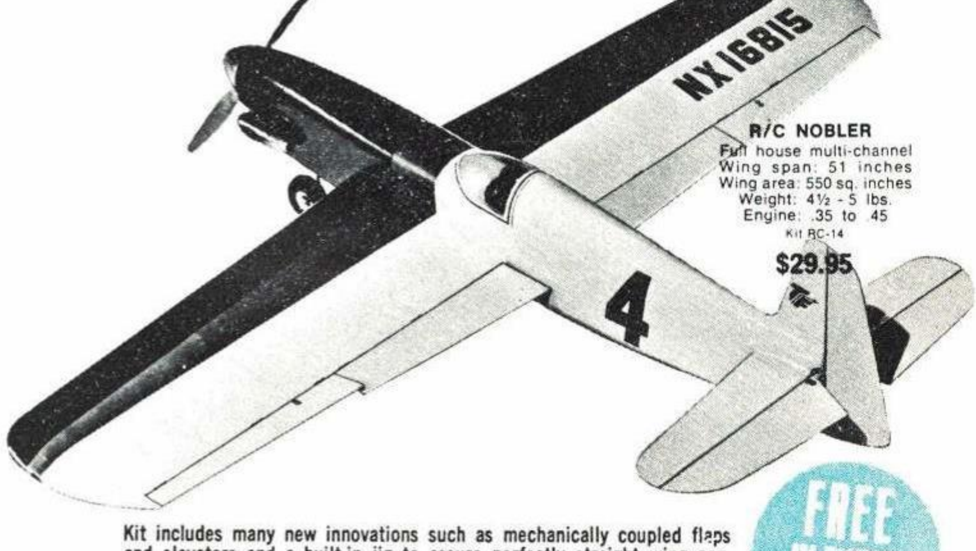

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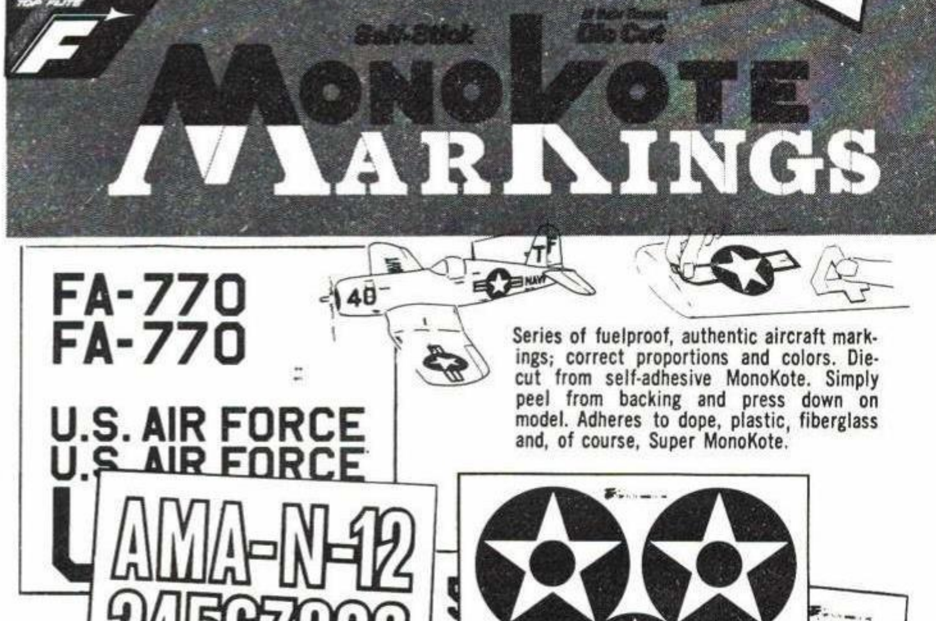

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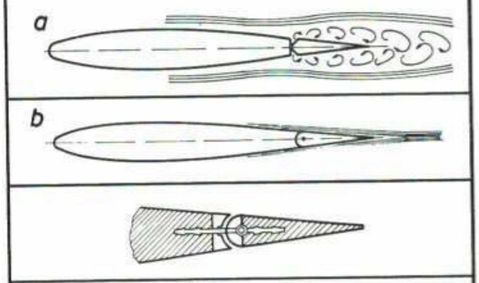

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Indoor World Championships

Continued from page 14

the Most Popular Contestant award, did a little research and found that of 150 models brought, 80 were destroyed—as he said, "Enough man hours to build a house." Since helium is extremely expensive in Europe (until now not needed in Slanic), and hydrogen-filled balloons too dangerous to be used in the mine, recovery was limited to air currents (blanket waving, vacuum cleaners and spotlights). The result of all this has led the Yugoslavian team to propose a rule change establishing a minimum weight for FAI models of one gram (.0354 oz.) and a maximum of one gram rubber. An informal poll found that only three contestants (two of whom were on the U. S. team) were definitely against these changes. About six were undecided or had other proposals, such as further wingspan reductions of 50 cm. (about 20 inches), or motor stick limitations, but the remainder supported the change. It looks as if this proposal will be presented at the next FAI meeting in November. According to Rudy Cerny, Czechoslovakian FAI representative, it is almost assured of passage, for the following reasons. (1) It is most difficult and expensive for European modelers to find suitable supplies (balsa and wire) for light models. (2) New people are not interested in entering this category because they couldn't compete with top fliers. (3) Transportation problems arise because the microfilm (clear to gold) is easily damaged. (4) More flying sites can be used because drafts will not be as critical with heavier models (balloon and pole steering is simpler). (5) Times will be reduced, thus enabling fifteen or sixteen countries to complete the required number of official flights. (6) Aerodynamics, workmanship, and flying ability will determine the ultimate champion."

He is also aware of the following disadvantages. (1) Indoor has always been considered an "ultimate" perfection of the art, therefore, some of the top fliers who consider these restrictions too prohibitive may be lost. (2) Processing will be a problem, but this is technical and can be solved with proper planning and preparation. (3) Models may have to be weighed at the completion of each flight to assure compliance with the weight rule."

Fortunately, this proposed rule change has been made early enough so that all its ramifications can be discussed and each FAI representative will vote the opinions of the interested parties in his country. My guess is that the majority of fliers in the U. S. will vote against this proposal, as they did when the wing span was reduced from 90 cm. to 65 cm.

The U. S. team was handicapped by not having enough models of the right kind (strong motor sticks and stiff props). This is not a criticism of Richmond, Mather, Andrews, and manager Bilgri. They expected no drift; therefore, four models would have been more than enough. But all of their best ships were hung up on test flights or first officials, so that the team had to take their last officials with models built for home conditions. They just couldn't gain enough altitude. The team's second place and Richmond's individual second are an indication of how hard each man worked, and we can all be quite proud of their results.

Jiri Kalina does deserve due credit for his performance. His models were flawless in construction and flying. The entire Czechoslovakian team did a great job. The U. S. led the team standing until the fourth round when Rybecky put up his best flight. From that point, Czechoslovakia held first place until the end.

The Fifth Indoor World Championship was a thrilling experience. Perhaps some day the United States will be able to host this event so that more Americans may share in this great spectacle.

Blohm-Voss 141-B

Continued from page 41

mount at the locations shown on the plan. For each gear wire, slide the longer leg into place on the mount, then mark the exact location for the second hole. Drill two more holes for the shorter wire ends and slip the gear into place. Make the final wire bends at the end where the wheels will slip on. The hardwood mounts with the wires in place now can be epoxied into the wing slot.

Fuselage and Pod: Trace the outlines onto the ¼" balsa and cut out. Sand completely, rounding off all edges, except the area where the stabilizer will sit. Cut out the notch for the hardwood tail-wheel mount. Tack glue the hardwood into place and round it off to the fuselage contour. Cut the hardwood loose again and fit the tail-wheel wire into it. Bend and fit the wire in the same manner as the main gear. Epoxy the wire and hardwood into place.

Next make the fuselage cutout for the wing. Cut out the rectangular section which runs along the very bottom of the wings and straight down from the leading and trailing edges, as marked on the plan. Then carve the upper airfoil shape into the fuselage, slipping the wing into place frequently to check progress. When the wing and the rectangular fuselage section fit properly, epoxy them into place, keeping everything squarely aligned. Fit the pod onto the wing in the same manner.

Make and install the engine mount and brace. The engine mounting holes can be drilled much more easily before the mount is epoxied to the fuselage.

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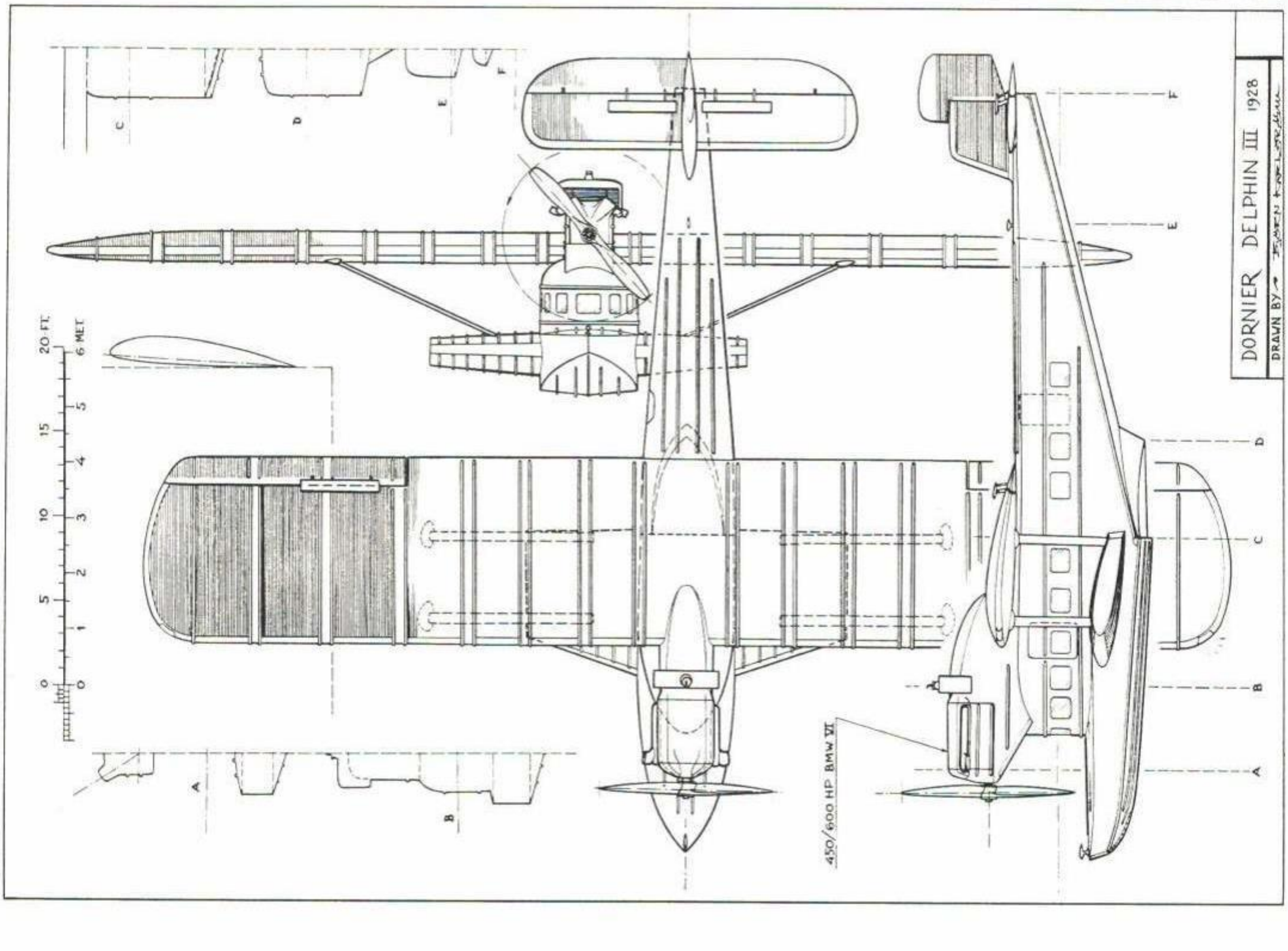

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ilizer and elevator parts. Sand to a symmetrical, streamlined shape. Select a control horn with ½" center to hole spacing, and mount it on the elevator. Attach the elevator to the stabilizer using figure-eight carpet-thread hinges, or other preferred method. Epoxy fin and rudder into place, with at least ¼" offset as shown. At this point make the plywood line guide and install it on the lower surface of the wing.

Finish: The wing and pod fillets were made of epoxy putty, although a lighter, faster-working material, such as plastic balsa could be used. The model pictured had three brushed-on coats of sanding sealer, rubbed generously with fine sandpaper between each coat. The sprayer was used after this, beginning with three coats of clear dope. The swastika and crosses were made by masking and painting, but perhaps could be added more easily afterwards by making cutouts from decal material.

The pod windows were made by painting the entire area white, then covering the white with masking tape while the other colors were added. Later the tape was stripped off and small black plastic tape ribbons used for the window pane dividers.

Three coats of the basic sky-blue color were sprayed on after the clear dope. Then a single coat of dark blue was applied in a camouflage pattern on the upper surfaces. At this point any masking is removed and three coats of clear sprayed on. When thoroughly dry, apply rubbing compound, then spray a final coat of clear dope, unrubbed for maximum fuel-proofing.

The two tones of blue on the original can be mixed using Corsair blue as the darker color, adding white to obtain the lighter blue for the base color.

Controls and Final Assembly: Bend the 1/16" wire pushrod to shape and install it at the same time the bellcrank is installed. Make a pushrod guide either from small wire or by clipping the head off a large safety pin and sliding the pushrod through the eye. Select a bellcrank with a 2" line spacing and install it below the wing, using epoxy on the bolts and nuts. Let the pushrod guide hang loosely until each pushrod end is installed, then install the guide into the fuselage, midway between bellcrank and elevator horn.

Add approximately ¾-oz. outboard wing weight. Use very light (.010 dia.) wire leadouts. Install wheels and wheel skirts. Veco wheels were used on the model shown. Mount the engine and tank. Standard ½A dacron flight lines are used. For best model durability, fly with care and precision, avoiding all unnecessary contact with the ground.

Materials List

½ x 6 x 36", soft balsa, wing; ¼ x 3 x 36", soft balsa, fuselage, pod; ⅛ x 3 x 24", soft balsa, stab, rudder; ¼ x ¼ x 10", hardwood, LG mount; ¼ x 1 ½ x 2 ½", plywood, engine mount; ⅛ x 3 x 4", plywood, line guide, braces; 3/32" dia. wire, landing gear; 1/16" dia. wire, pushrod; .020 x 3 x 5" aluminum, wheel skirts (optional).

Hardware items, such as wheels, controls, engine, and finishing materials, are not included in the materials list, but are shown on the plans or described.

Fairchild 24

Continued from page 45

6-440-C2 engine.

F 24-W46 — built in 1946-48 with 165-hp Warner Super Scarab engine. Total production of W46 and R46 was 280.

UC-61 — 163 F24-W41 built for USAAF in 1941-42; 161 to RAF as Argus 1.

UC-61A — 512 F24-W41A built for USAAF in 1942; 364 to RAF as Argus 2.

UC-61B — one civil F 24-J impressed by USAAF in 1942.

UC-61C — one civil F 24-R9 impressed by USAAF in 1942.

UC-61D — (not an F 24; three civil Fairchild 51-A impressed by USAAF).

UC-61E — three civil F 24-K impressed by USAAF in 1942.

UC-61F — two civil F 24-R9 impressed by USAAF in 1942.

UC-61G — two civil F 24-W40 impressed by USAAF in 1942.

UC-61H — one civil F 24-G impressed by USAAF in 1942.

UC-61J — one civil F 24-C8F impressed by USAAF in 1942.

UC-61K — 306 F 24-W40 powered by 200-hp Ranger 6-440-C5 engines for RAF as Argus 3.

UC-86 — nine civil F 24-R40 impressed by USAAF in 1942.

XUC-86A — one UC-86 converted to Ranger L-440-7 engine in 1943.

XUC-86B — one UC-86 converted to Franklin XO-405-7 engine in 1943.

J2K — four F 24-C8F built for U. S. Navy in 1936.

GK-1 — 11 miscellaneous civilian models impressed by the U. S. Navy in 1942.

Argus 1 — 161 F 24-W41 for RAF.

Argus 2 — 364 F 24-W41A for RAF in 1942-43.

Argus 3 — 306 UC-61K for RAF in 1944.

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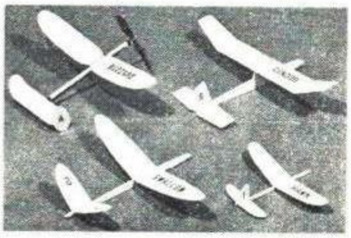
BILL DEAN'S BOOK OF BALSA MODELS

Just published — illustrated instructions for eighteen fast-building models from sheet balsa — each complete with full-size plans, by one of the world's best-known model plane designers, with more than 500 magazine and kit designs to his credit, including Sig's PT-19 and J-3 R/C kits.

Six of the models comprise a complete "Trainer Course" and include a hand-launch glider, towline/catapult glider, Jetex "swept-wing", rubber-powered stick model, parasol-wing towline glider and rubber-powered cabin model. On sale at your Sig hobby dealer for $2.95 — this book is also available direct from Sig for $3.45 (price includes packing and postage).



SIG 'AAA' BALSA — NEW PRICE LIST

SHEETS

36" LENGTHS
1/32 × 2 20¢
1/16 × 2 23¢
3/32 × 2 26¢
1/8 × 2 31¢
3/16 × 2 36¢
1/4 × 2 46¢
3/8 × 2 53¢
1/32 × 3 32¢
1/16 × 3 32¢
3/32 × 3 40¢
1/8 × 3 45¢
3/16 × 3 54¢
1/4 × 3 72¢
3/8 × 3 85¢
1/32 × 4 45¢
1/16 × 4 45¢
3/32 × 4 49¢
1/8 × 4 63¢
3/16 × 4 72¢
1/4 × 4 80¢
3/8 × 4 1.08
1/32 × 6 98¢
1/16 × 6 98¢
3/32 × 6 1.15
1/8 × 6 1.17
3/16 × 6 1.26
1/4 × 6 1.40
3/8 × 6 1.71
1/32 × 8 1.21
1/16 × 8 1.25
3/32 × 8 1.35
1/8 × 8 1.40
3/16 × 8 1.55
1/4 × 8 1.75
3/8 × 8 1.95

48" LENGTHS
1/32 × 3 43¢
1/16 × 3 43¢
3/32 × 3 54¢
1/8 × 3 62¢
3/16 × 3 72¢
1/4 × 3 89¢
3/8 × 3 1.24
1/16 × 4 62¢
3/32 × 4 68¢
1/8 × 4 80¢
3/16 × 4 94¢
1/4 × 4 1.05
3/8 × 4 1.38
1/16 × 6 1.35
3/32 × 6 1.46
1/8 × 6 1.56
3/16 × 6 1.68
1/4 × 6 1.87
3/8 × 6 2.20

36" LENGTHS
CONTEST
4-6 LB. STOCK
1/32 × 3 37¢
1/16 × 3 37¢
3/32 × 3 45¢
1/8 × 3 50¢
3/16 × 3 59¢
1/4 × 3 75¢
3/8 × 3 92¢

C-GRAIN
8-12 LB. STOCK
1/32 × 2 26¢
1/16 × 2 28¢
3/32 × 2 31¢
1/8 × 2 36¢
3/16 × 2 41¢
1/4 × 2 51¢
3/8 × 2 57¢
1/32 × 3 36¢
1/16 × 3 36¢
3/32 × 3 44¢
1/8 × 3 49¢
3/16 × 3 58¢
1/4 × 3 76¢
3/8 × 3 89¢

V-H STOCK
12 LB. OR MORE
1/16 × 3 36¢
3/32 × 3 44¢
1/8 × 3 49¢
3/16 × 3 58¢
1/4 × 3 76¢
3/8 × 3 89¢

STRIPS

36" LENGTHS
■ 1/16 SQ. 3¢
1/16 × 1/8 3¢
1/16 × 3/16 4¢
1/16 × 1/4 6¢
1/16 × 3/8 7¢
1/16 × 1/2 10¢
1/16 × 3/4 12¢
1/16 × 1 15¢
■ 3/32 SQ. 5¢
3/32 × 3/16 5¢
3/32 × 1/4 6¢
3/32 × 3/8 7¢
3/32 × 1/2 10¢
3/32 × 3/4 15¢
3/32 × 1 17¢
■ 1/8 SQ. 5¢
1/8 × 3/16 5¢
1/8 × 1/4 7¢
1/8 × 3/8 10¢
1/8 × 1/2 12¢
1/8 × 3/4 16¢
1/8 × 1 20¢
■ 3/16 SQ. 8¢
3/16 × 1/4 12¢
3/16 × 3/8 12¢
3/16 × 1/2 16¢
3/16 × 3/4 19¢
3/16 × 1 22¢
■ 1/4 SQ. 13¢
1/4 × 3/8 15¢
1/4 × 1/2 18¢
1/4 × 3/4 24¢
1/4 × 1 30¢
■ 5/16 SQ. 15¢
5/16 × 3/8 20¢
5/16 × 1/2 25¢
5/16 × 5/8 32¢
5/16 × 1 35¢
■ 3/8 SQ. 18¢
3/8 × 1/2 28¢
3/8 × 3/4 32¢
3/8 × 1 43¢
■ 1/2 SQ. 27¢
1/2 × 3/4 36¢
1/2 × 1 45¢
■ 5/8 SQ. 32¢
5/8 × 1 42¢
■ 3/4 SQ. 42¢
3/4 × 1 52¢

48" LENGTHS
■ 1/8 SQ. 7¢
1/8 × 1/4 10¢
1/8 × 1/2 16¢
■ 3/16 SQ. 11¢
3/16 × 1/2 22¢
3/16 × 3/4 26¢
■ 1/4 SQ. 18¢
1/4 × 1/2 24¢
1/4 × 3/4 32¢
■ 5/16 SQ. 20¢
■ 3/8 SQ. 24¢
3/8 × 1/2 31¢
3/8 × 3/4 42¢
■ 1/2 SQ. 36¢
1/2 × 3/4 49¢

36" LENGTHS
SHAPED L.E.
3/8 × 1/2 28¢
1/2 × 1/2 32¢
3/4 × 3/4 50¢
1 × 1 72¢

SHAPED T.E.
1/8 × 1/2 17¢
3/16 × 3/4 20¢
1/4 × 1 26¢
5/16 × 1-1/4 31¢

TRIANGULAR CUT
1/4 SIDES(X) 17¢
3/8 SIDES(X) 22¢
1/2 SIDES(X) 25¢
3/4 SIDES(X) 36¢
1 SIDES(X) 49¢

BLOCKS

3" LENGTHS
■ 1 SQ. 6¢
1 × 2 12¢
2 × 2 16¢
1 × 3 16¢
2 × 3 23¢
3 × 3 36¢

6" LENGTHS
■ 1 SQ. 12¢
1/2 × 2 14¢
3/4 × 2 19¢
1 × 2 22¢
1-1/2 × 2 26¢
2 × 2 30¢
1/2 × 3 20¢
3/4 × 3 26¢
1 × 3 31¢
1-1/2 × 3 38¢
2 × 3 42¢
3 × 3 70¢
1/2 × 4 30¢
3/4 × 4 35¢
1 × 4 40¢
1-1/2 × 4 52¢
2 × 4 62¢
3 × 4 90¢
1/2 × 6 44¢
3/4 × 6 50¢
1 × 6 59¢
1-1/2 × 6 82¢
2 × 6 92¢
3 × 6 1.35

12" LENGTHS
■ 1 SQ. 22¢
1/2 × 2 28¢
3/4 × 2 35¢
1 × 2 42¢
1-1/2 × 2 50¢
2 × 2 60¢
1/2 × 3 38¢
3/4 × 3 54¢
1 × 3 60¢
1-1/2 × 3 73¢
2 × 3 89¢
3 × 3 1.35
1/2 × 4 59¢
3/4 × 4 67¢
1 × 4 79¢
1-1/2 × 4 99¢
2 × 4 1.20
3 × 4 1.79
1/2 × 6 96¢
3/4 × 6 99¢
1 × 6 1.15
1-1/2 × 6 1.60
2 × 6 1.84
3 × 6 2.68
1/2 × 8 94¢
3/4 × 8 1.17
1 × 8 1.55
1-1/2 × 8 1.75
2 × 8 2.16
3 × 8 3.10

18" LENGTHS
■ 1 SQ. 31¢
1 × 2 63¢
2 × 2 90¢
1 × 3 92¢
2 × 3 1.38
3 × 3 2.03
1 × 4 1.18
2 × 4 1.80
3 × 4 2.70
1 × 6 1.72
2 × 6 2.75
3 × 6 4.00
1 × 8 2.25
2 × 8 3.25
3 × 8 4.65

24" LENGTHS
■ 1 SQ. 44¢
1 × 2 84¢
2 × 2 1.20
1 × 3 1.20
2 × 3 1.80
3 × 3 2.73
1 × 4 1.58
2 × 4 2.40
3 × 4 3.58
1 × 6 2.30
2 × 6 3.65
3 × 6 5.26
1 × 8 3.10
2 × 8 4.30
3 × 8 6.30

★ SECOND GRADE SHEETS
36" LENGTHS
1/32 × 3 18¢
1/16 × 3 18¢
3/32 × 3 22¢
1/8 × 3 25¢
3/16 × 3 29¢
1/4 × 3 38¢
3/8 × 3 48¢

PLANKS
36" LENGTHS
■ 1 SQ. 60¢
1/2 × 2 85¢
3/4 × 2 1.05
1 × 2 1.26
1-1/2 × 2 1.55
2 × 2 1.75
1/2 × 3 1.29
3/4 × 3 1.67
1 × 3 1.75
1-1/2 × 3 2.20
2 × 3 2.65
3 × 3 4.13
1/2 × 4 1.73
3/4 × 4 2.00
1 × 4 2.25
1-1/2 × 4 2.93
2 × 4 3.35
3 × 4 5.25
1/2 × 6 2.56
3/4 × 6 2.95
1 × 6 3.45
1-1/2 × 6 4.73
2 × 6 5.50
3 × 6 7.00
1/2 × 8 2.80
3/4 × 8 3.50
1 × 8 4.50
1-1/2 × 8 5.25
2 × 8 6.30
3 × 8 9.25

NEW BALSA ADDITIONS

SHEETS — 36" LENGTHS
3/32 × 3 × 36 50¢
1/20 × 3 × 36 32¢
5/16 × 3 × 36 76¢
TAPER CUT SHEETS (TO 1/16" EDGE)
1/4 × 3 × 36 74¢
1/4 × 4 × 36 82¢
ROUNDED-EDGE PLANKING
5/32 × 1/4 × 36 LENGTHS 8¢ EACH
ROUNDED-EDGE (Aileron & Elevator)
1/4 × 1 × 36 40¢
1/4 × 2 × 36 55¢
3/8 × 1 × 36 45¢
3/8 × 2 × 36 65¢
WING SKINS — 36" LENGTHS
1/16 × 12 × 36 1.75
3/32 × 12 × 36 1.95

SIG SPRUCE

36" LENGTHS
1/16 × 1/8 5¢
1/16 × 3/16 6¢
1/16 × 1/4 7¢
3/32 × 3/32 5¢
3/32 × 1/8 6¢
3/32 × 3/16 7¢
3/32 × 1/4 9¢
1/8 × 1/8 6¢
1/8 × 3/16 7¢
1/8 × 1/4 8¢
1/8 × 3/8 10¢
1/8 × 1/2 13¢
1/8 × 3/4 17¢
3/16 × 3/16 9¢
3/16 × 1/4 9¢
3/16 × 3/8 11¢
3/16 × 1/2 14¢
1/4 × 1/4 15¢
1/4 × 3/8 18¢
1/4 × 1/2 22¢
3/8 × 3/8 24¢

48" LENGTHS
3/32 × 3/32 7¢
3/32 × 1/8 8¢
3/32 × 3/16 9¢
3/32 × 1/4 10¢
1/8 × 1/8 8¢
1/8 × 3/16 9¢
1/8 × 1/4 11¢
1/8 × 3/8 14¢
1/8 × 1/2 17¢
1/8 × 3/4 22¢
3/16 × 3/16 12¢
3/16 × 1/4 12¢
3/16 × 3/8 15¢
3/16 × 1/2 19¢
1/4 × 1/4 20¢
1/4 × 3/8 24¢
1/4 × 1/2 30¢
3/8 × 3/8 32¢

24" LENGTH
3/16 × 3/4 15¢

LARGE BUNDLE OF ASSORTED STRIPS — "SHORTS" AND "SECONDS" 89¢

BIRCH PLYWOOD

FINEST GRADE — FLAT SHEETS

12" LENGTHS
1/32 × 6 30¢
1/16 × 6 25¢
3/32 × 6 35¢
1/8 × 6 40¢
3/16 × 6 40¢
1/4 × 6 45¢
1/32 × 12 60¢
1/16 × 12 70¢
3/32 × 12 70¢
1/8 × 12 80¢
3/16 × 12 80¢
1/4 × 12 90¢

24" LENGTHS
1/32 × 12 1.20
1/16 × 12 1.40
3/32 × 12 1.40
1/8 × 12 1.60
3/16 × 12 1.60
1/4 × 12 1.80

48" LENGTHS
1/32 × 12 2.40
1/16 × 12 2.80
3/32 × 12 2.80
1/8 × 12 3.20
3/16 × 12 3.20
1/4 × 12 3.60

SIG BASS WOOD

18" LENGTH SHEETS
1/16 × 2-1/2 15¢
3/32 × 2-1/2 17¢
1/8 × 2-1/2 19¢
3/16 × 2-1/2 23¢
1/4 × 2-1/2 28¢
3/8 × 2-1/2 35¢

BLOCKS
1/2 × 3/4 × 6 6¢
1/2 × 3/4 × 12 11¢
1/2 × 3/4 × 18 16¢
3/4 × 3/4 × 6 7¢
3/4 × 3/4 × 12 14¢
3/4 × 3/4 × 18 20¢
3/4 × 1 × 6 9¢
3/4 × 1 × 12 17¢
3/4 × 1 × 18 26¢
3/4 × 2 × 6 14¢
3/4 × 2 × 12 27¢
3/4 × 2 × 18 40¢
3/4 × 3 × 6 19¢
3/4 × 3 × 12 37¢
3/4 × 3 × 18 55¢
3/4 × 4 × 6 24¢
3/4 × 4 × 12 47¢
3/4 × 4 × 18 70¢

SIG BIRCH DOWELS

12" LENGTHS
1/8 dia. 3¢
3/16 dia. 4¢
1/4 dia. 5¢
5/16 dia. 5¢
3/8 dia. 6¢
1/2 dia. 7¢

36" LENGTHS
1/8 dia. 6¢
3/16 dia. 9¢
1/4 dia. 10¢
5/16 dia. 12¢
3/8 dia. 15¢
1/2 dia. 20¢

1/16 dia. available in 12" lengths 2¢

SIG DECAL PROOFER

MAKES ALL DECALS FUEL-PROOF & DURABLE (ONLY ONE COAT REQ.) 4 Oz. Jar, 59¢ 5 Oz. Spray, 59¢

SIG MODEL PINS

#8 1/2 Long
#14 7/8 Long
#16 1 Long
#17 1-1/8 Long
#20 1-1/4 Long
#24 1-3/8 Long
#28 1-5/8 Long
#32 2 Long

Pkt. 15¢ 1/4 lb. $1.15 1 lb. $3.95

MODEL MAKER'S "T" PINS
Pkt. 15¢ 1 oz. box 39¢ 4 oz. box $1.35

SIG RUBBER BANDS

#8 1/16 × 7/8
#10 1/16 × 1-1/4
#14 1/16 × 2
#16 1/16 × 2-1/2
#[illegible] 1/8 × 2
#[illegible] 1/8 × 3
#62 1/4 × 2-1/2
#64 1/4 × 3-1/2
#84 1/2 × 3-1/2
#105 5/8 × 5
#107 5/8 × 7

PACKETS 15¢

ALL SIZES AVAILABLE IN BULK AT: 1/4 lb. Pkg. $1.10 1 lb. Pkg. $3.95

SIG AIROLAC

OUR NEW HIGH-GLOSS CELLULOSE ACETATE BUTYRATE DOPE FEATURES TRIPLE-GROUND PIGMENTS FOR AN ULTRA-SMOOTH, GLASS-LIKE FINISH. IT'S FAST-FILLING & LEVELING — BLUSH-RESISTANT & FADE-PROOF. NOW AVAILABLE IN 15 COLORS:

Lt. Red, Medium Red, Gloss White, Lemon Yellow, Cub Yellow, Gray, Med. Blue, Dark Green, Gloss Black, Sky Blue, Brite Green, Brite Orange, Dark Blue, Brite Silver, Brite Gold

COLOR: 4 oz. 69¢ 8 oz. $1.19 Pint $1.79 Qt. $2.98 Gal. $8.95
CLEAR: 4 oz. 59¢ 8 oz. 98¢ Pint $1.49 Qt. $2.39 Gal. $7.19
THINNER: 4 oz. 39¢ 8 oz. 59¢ Pint 95¢ Qt. $1.69 Gal. $4.29

AIROLAC ALSO AVAILABLE IN PINT SPRAY CANS ($1.49) IN ALL COLORS

SIG CORE BOND

NEW CONTACT TYPE CEMENT FOR BONDING WOOD OR PLASTIC TO STYROFOAM. Pint $1.95 Qt. $3.50

SIG DOPE BRUSHES

FINEST QUALITY CAMEL HAIR — IN TWO WIDTHS: 5/8 23¢ 1" 23¢

RAZOR PLANE

USES DOUBLE-EDGED BLADES $1.39

R/C FUEL TANKS

NEW SIG DESIGN HAS TWO-PIECE PLUG & LEAK-PROOF SCREW-CAP / PLASTIC CONTAINER AND FLEXIBLE PICK-UP / NON-CORROSIVE BRASS TUBING: 2 oz. 95¢ 4 oz. $1.05 6 oz. $1.15 8 oz. $1.25 12 oz. $1.40

PRESSURE FUEL PUMPS

FAST, EASY WAY TO FILL BIG FUEL TANKS. AVAILABLE IN: Quart $2.89 Half Gallon $3.19 Gallon $3.49 Pump Only $2.39 Primer Bottle 29¢

COPPER WIRE

FOR BINDING C/LINES, L/GEAR 15¢

SIG EPOXY

STRONGEST GLUE EVER DEVELOPED FOR THE MODELER. COMES IN 2 PARTS (A & B) — IN POLYETHELENE SQUEEZE BOTTLES, WITH SPECIAL NO-DRIP SPOUT: 1-1/2 oz. pack 89¢ 3 oz. pack $1.39 12 oz. pack $2.95

SIG EPOXOLITE

NEW 2-PART EPOXY PUTTY. LIGHT AS BALSA & STRONG AS EPOXY. QUICK SETTING. EASY TO WORK. LONG SHELF LIFE. EXCELLENT BUTYRATE DOPE ADHESION. CAN BE CARVED, SAWN AND SANDED. 4 oz. Set $1.69 8 oz. Set $2.95

SIG NYLON SHEET

.010 THICK NYLON, MAKES 16 R/C OR C/L HINGES (3 × 4 SHEET). 25¢

SIG CONTEST RUBBER

NEW "HIGH POWER" RUBBER STRIP: 1 LB. of 1/8" $5 1 LB. of 1/4" $5

SIG CELLULOID

.008 × 8 × 10 12¢ .015 × 8 × 10 30¢

FLITE-FOAM

WHITE EXPANDED BEAD FOAM (1 lb. PER CUBIC FOOT) 12" WIDE PLANKS
1 × 12 35¢ 1 × 36 90¢ 1 × 48 $1.20
2 × 12 69¢ 2 × 36 $1.80 2 × 48 $2.40
3 × 12 89¢ 3 × 36 $2.70 3 × 48 $3.60

NEW CELASTIC

FANTASTIC NEW PLASTIC MATERIAL BECOMES SOFT AND PLIABLE WHEN DIPPED IN THINNER. MOLDS TO ANY SHAPE — CAN BE SANDED & DOPED. PERFECT FOR COWLINGS, FILLETING & REINFORCING USES. 9 × 18 SHEETS: Light 85¢ Heavy $1.00

WE HAVE NEARLY ALL MODEL AIRPLANE PRODUCTS ADVERTISED

SIG FOAM BOND

NEW CONTACT TYPE CEMENT FOR BONDING BALSA TO EXPANDED POLYSTYRENE / WILL NOT ATTACK FOAM / COLORLESS & STAINLESS. PINT Can $1.25 QUART Can $1.95 THINNER: PINT Can 89¢

SIG NYLON PUSHROD

COMPLETE WITH THREADED STUD & SERVO CONNECTOR, AVAIL. IN 2 SIZES: 30" Set, 79¢ 48" Set, $1.25
BULK PUSHROD (10 Ft. Length) $1.49
PUSHROD STUDS (Set of Three) 10¢
PUSHROD KEEPER (Set of Two) 25¢

SIG SHEET NYLON

USE .010" THICKNESS FOR HINGE MATERIAL; 1/16" FOR BELLCRANKS, CONTROLHORN EXTENSIONS; 1/8" FOR HEAVY-DUTY BELLCRANKS AND BEARINGS; 1/4" FOR SPECIAL NOSE BEARING BLOCKS AND OTHER ITEMS.
.010 × 2 × 4, 25¢ 1/16 × 2 × 4, 60¢
1/8 × 2 × 4, 95¢ 1/4 × 1 × 4, $1.00

SIG NYLON WING SCREWS

1/4-20 × 1" Package of 4, 39¢
1/4-20 × 1-1/2" Package of 4, 49¢
8-32 × 1" Package of 4, 35¢

SIG NYLON BUSHINGS

THREE SIZES NOW AVAILABLE — AT 15¢ PER PACKAGE: #4 #6 #8

SIG NYLON WASHERS

FOUR SIZES (Inter. Dia.) AVAILABLE AT 15¢ PER PACKAGE: 3/32" Dia., 1/8" Dia., 5/32" Dia., 3/16" Dia.

SIG NYLON ACCESSORIES

SERVO MOUNT SCREWS, 4 for 29¢
R/C 90° BELLCRANK (with bolt), 25¢
R/C CONTROL HORNS (with bolts), IN LONG OR SHORT SIZES, 25¢ ea.

SIG HARDWARE

BLIND MOUNTING NUTS, 4 per Pkg: 2-56 Size, 20¢ 3-48 Size, 20¢ 4-40 Size, 20¢ 6-32 Size, 25¢
NUTS AND BOLTS, 4 each per Pkg: 2-56 × 3/8, 15¢ 4-40 × 1", 20¢ 3-48 × 3/4, 15¢ 4-40 × 1-1/2, 20¢ 4-40 × 3/8, 15¢ 6-32 × 1-1/2, 25¢
3/8" WOOD SCREWS, per Pkg., 15¢ IN THREE SIZES #1 #2 #3
2-1/2" METAL C/L BELLCRANK, 15¢
SPADE BOLTS, Package of 4 for 25¢
J-Type BOLTS, Package of 4 for 25¢
THREADED HARDWOOD BLOCKS, IN 2 SIZES, 25¢ Pair: 1/4-20 8-32
ENGINE MOUNT SCREWS IN TWO SIZES, 4 for 15¢: #4 × 1/2 #6 × 3/4
R/C LANDING GEAR HARDWOOD BLOCKS (PACKAGE OF TWO), 39¢
R/C LINK, WITH 8" LONG ROD, 15¢
R/C ROD COUPLERS, Pkg. of 4, 25¢
AIRCRAFT TAPE: 1", 20¢ 2", 35¢
1/2A C/L DACRON LINE (ea.), 35¢
SOCKET HEAD SCREWS (PKG. OF 4 WITH WRENCH): 4-40 × 3/4, 49¢ 6-32 × 1", 55¢ 8-32 × 1-1/2", 59¢
MASKING TAPE (12 FOOT), 15¢ PER ROLL: 1/8" 1/4" 3/8" 1/2"
HEATPROOF FUEL LINE: ABSOLUTELY HEAT AND FUEL PROOF — SUITABLE FOR ALL ENGINES (OFF THE JET). LARGE FUEL LINE (per foot), now 45¢. MEDIUM FUEL LINE (per ft.), now 25¢

SIG JAP TISSUE

PRE-WAR QUALITY JAPANESE TISSUE IN ORANGE, YELLOW, RED, WHITE, BLUE OR BLACK. 18 × 20 sheet 7¢

BAMBOO PAPER

HEAVIER THAN OUR REGULAR JAP TISSUE — IN YELLOW, RED, WHITE, BLUE OR BLACK. 21 × 31 sheet 15¢

SILKSPAN

00 WHITE: 19-1/2 × 24-1/2 sheet 5¢
GM WHITE: 24 × 36 sheet 10¢
SGM WHITE: 26-1/2 × 33-1/2 sheet 15¢

SIGRAY

NEW SIG COVERING MATERIAL — A BLEND OF RAYON AND SILK, IN WHITE, BLACK, RED, YELLOW AND BLUE (36" WIDTH). Per Yard $1.25

SIG NYLON

WHITE, 36 × 48, IN PACKAGE. $1.25

SIG SILK

FOR R/C MODELS — IN RED, BLUE, WHITE, GOLD OR GREEN (36" × 36") HEAVY $1.75 EXTRA-HEAVY* $2.00 — *EXTRA-HEAVY IN WHITE ONLY

JAP SILK

LIGHT-WEIGHT, FOR SMALL GAS, RUBBER, GLIDER ETC. — IN RED, WHITE, BLUE, GREEN, / SILVER OR GOLD. 36" × 36" (sheet), $1.50

SIG SUPERCOAT FUEL PROOF DOPE

BRILLIANT WHITE • DIANA CREAM
POLAR GRAY • BROWN • JET BLACK
LEMON YELLOW • TENNESSEE RED
CUB YELLOW • ORANGE • MAROON
LIGHT RED • SILVER • OLIVE DRAB
FOREST GREEN • BRIGHT GREEN
DK. GREEN • DK. BLUE • LIGHT BLUE
MIAMI BLUE • CLEAR • THINNER

PLUS 5 NEW SUPERCOAT COLORS — GOLD, COPPER, METALLIC GREEN, METALLIC BLUE, METALLIC MAROON

COLOR	CLEAR	THINNER
4 oz. 59¢	4 oz. 50¢	4 oz. 39¢
8 oz. 95¢	8 oz. 89¢	8 oz. 59¢
Pint 1.49	Pint 1.39	Pint 95¢
Qt. 2.79	Qt. 2.19	Qt. 1.69
Gal. 7.95	Gal. 6.59	Gal. 4.39

SIG SUPERCOAT IN NEW SPRAY CANS

ALL 19 SUPERCOAT COLORS, PLUS CLEAR, NOW AVAILABLE IN THESE HANDY, LOW-COST SPRAY CANS: 3 oz. 49¢ 6 oz. 79¢ Pint 1.39

SURGICAL TUBING

THIN WALL, FOR FUEL LINE & USE WITH CLOCKWORK TIMERS 15¢ FT.

SIG FUEL-RESISTANT DECAL SHEETS

BRAND NEW LINE OF 44 DIFFERENT SIG MODEL PLANE DECAL SHEETS

- ★ SOLID COLORS (CHOICE OF 9): RED, WHITE, BLUE, BLACK, YELLOW, ORANGE, GREEN, GOLD OR SILVER
- ★ CHECKERBOARD (1/4" AND 1/2" SQUARES): RED, BLUE, GREEN (ON WHITE) • RED, WHITE, BLUE, BLACK, YELLOW, ORANGE, GREEN, GOLD OR SILVER (ON CLEAR) • ORANGE (ON BLACK) • RED (ON YELLOW)
- ★ STRIPES (1/4", 3/8" & 1/2" WIDTH ON EACH SHEET): RED, WHITE, BLUE, YELLOW, ORANGE, BLACK, GREEN, GOLD OR SILVER (ALL ON CLEAR)
- ★ STARS (5-PT.): RED, BLUE OR BLACK (ON WHITE) • RED, WHITE, BLUE, YELLOW, ORANGE, BLACK, GREEN, GOLD OR SILVER (ON CLEAR)

TWO 4-1/4 × 11 DECAL SHEETS 45¢

SANDPAPER

TEN 4-1/2 × 5-1/2 ASS. SHEETS 19¢

GARNET PAPER

FIVE 4-1/2 × 5-1/2 FINE SHEETS 19¢

SIG PIANO WIRE

1/32 dia. 6¢
3/64 dia. 7¢
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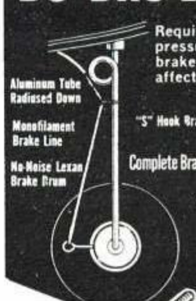
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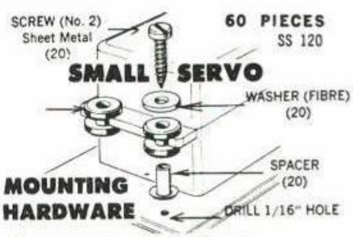

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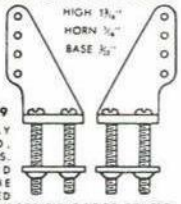

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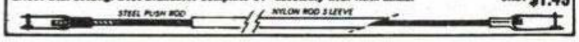

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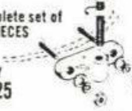

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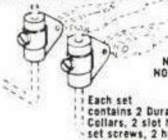

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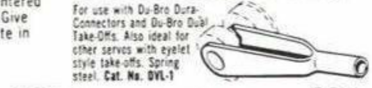

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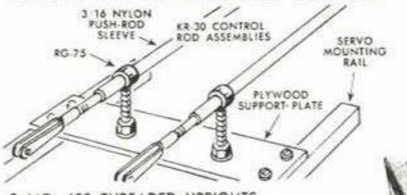

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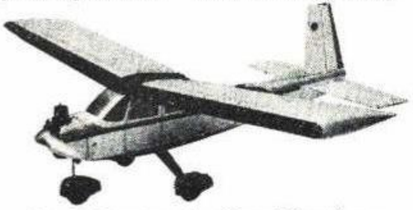

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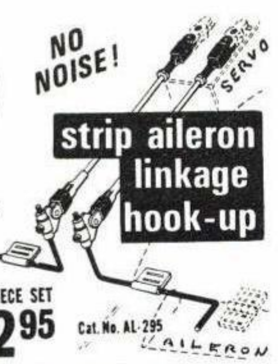

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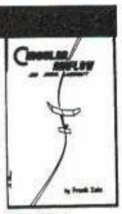

MODEL AERO PUBN • Box 135 NORTHRIDGE • CAL. 91324

Mini Mono

Continued from page 27

Note that the switch is removable but is held in place by the wing. Use a small brace to strengthen the notch-weakened area. The battery is wrapped in foam and wedged into the nose area.

Hobbypoxy clear was used on all sheet surfaces. Three coats give a light fuel-proof finish with no warpage. A bit of colored trim livens up the model. The original wing was covered with Japanese tissue, but I intend to recover it with MonoKote. Weed-ripped tissue is too often a problem.

Check for 5 degrees down- and 3 degrees rightthrust for the first flights. Do test flying over a grassy field on a calm day. Use a restrictor on the engine and conduct powered glides, increasing power and making adjustments to thrustline and elevator if necessary. Keep the model in close. These small models can't carry much antenna (a vertical antenna is recommended), and orientation is difficult if they are too far away.

1970 R/C Systems

Continued from page 25

Min-X Radio, Inc., 8714 Grand River, Detroit, Mich. 48204

Claiming the first **all-FET receiver section, CRC digital systems** are available in three and four controls. Former has one stick for two controls, small panel lever for third. Larger system has two control sticks — can be factory-converted to five or six controls any time after purchase. Special lockout feature in decoder provides immunity to noise pickup; silicon transistors and integrated circuits assure stable long-life operation. Four-control system airborne weight is 15 oz. All systems available on 27, 50 and 72 MHz (for use in U. S. — Canadian license for 72 has just been approved). Servos offer both push-pull and rotary output. Transmitter power output is about 1 watt. Complete four-control system, $415 in U. S. ($435 in Canada. **Canadian Radio Control Electronics,** 38 Guardsman Rd., Thornhill, Ont., Canada

Digital systems for two, four and six controls available from **Citizen-Ship Radio Div.,** on 27, 50 and 72 MHz (two-control system available only on 27). Integrated circuits featured in both servos and receivers. Servos have both push-pull and rotary outputs, weigh 2⅜ oz. each. Receivers have crystal IF filters for narrow frequency response. Two-stick transmitters have zero-center meter; in one direction it shows battery current with transmitter on, in other it indicates charging current. Transmitters are vinyl-clad, sticks are enclosed. All connectors in airborne system have gold-plated contacts. Six-control system with four servos, $349.50 on 50 or 72 MHz spots, $20 less on 27 MHz. Two-control system, two servos, $164.50. **Citizen-Ship Radio Div., Curtis Dyna-Products Corp.,** Box 297, Westfield, Ind. 46074

Five-hour burn-in on all **control systems** of **Integrated Designs** is intended to catch defective components before shipment. Four-control digital outfit has two-stick transmitter with one watt output. Receiver utilizes FETS; integrated circuits are featured. Airborne weight is 13 oz. Complete with nickel-cad batteries for transmitter and model, system is $199.95 ready-to-use, with 90-day warranty. **Integrated Designs,** 8722 Camelback Rd., Scottsdale, Ariz. 85251

Vega

Continued from page 16

These laminated spruce rings had a cross-sectional dimension varying from 3″ square in areas of the highest load stress (i.e., where wing and landing gear were attached) to ¾″ square near the tail.

This design and the single shell (or monocoque) type of construction contributed to substantial savings in weight and material. Affording the same interior length and width of a fuselage at 35% less waste in cross-sectional area, the strength of the whole came from the outside skin rather than from the usual excessive internal framing.

Monocoque fuselages were nothing new. They had been used previously in British, German, and French military aircraft and by several successful racing-type airplanes (i.e., the Schneider Cup, 1926). However, monocoque construction required laborious application and gluing of plywood strips over a rounded framework. Besides being terribly expensive, it often wound up all unsprung even before the job was completed.

The Vega's unique fabricating process resulted after years of thinking by Allan Lockheed, Jack Northrop and Tony Stadlman. Although the Loughead Aircraft Manufacturing Company collapsed in 1921, the three continued to meet. Talk generally centered around the possibilities presented by the monocoquing process they, along with Malcolm Lockheed, had developed in 1919. Finally, in December 1926, the newly formed Lockheed Aircraft Company moved into the corrugated metal building that was the birthplace of the Vega.

One of the first items constructed was a well-braced wooden "plug" the exact desired shape and size of the length and girth of one-half of a finished fuselage. After it had been smoothly finished, the plug was laid (curved side down) in a rectangular wooden form containing steel reinforcing rods. Yards and yards of concrete were poured around the plug, then carefully tamped and smoothed to a perfect shape. To assure uniformity in the fit of the fuselages, only one mold was made. When finished it measured 28 feet and weighed 30 tons.

To create a fuselage, the Lockheed/Stadlman/Northrop method called for three layers of spruce strips to be alternately laid and thoroughly slopped with casein glue. The inner and outer layers ran longitudinally while the center ply was laid at right angles.

The $1/24$″ thick, gore-shaped longitudinals (tapered from one inch at either end to six inches at the center) were vertical-grained spruce veneers spliced to 25-ft. lengths. Stacks of about 30 each of these gores were laid out and lightly tacked down along the length of the original plug. Once aligned, the gores were secured in place with long strips of paper tape. The lay-up then could be removed and stored until needed.

The shorter, $1/16$″ thick spruce center ply

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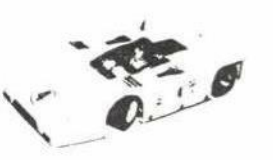

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3/16 x 2	10 sheets	4.50	3.37
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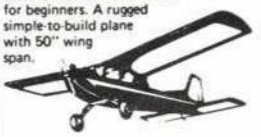

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strips were then laid transversely on the plug in a similar fashion and firmly secured by a transfer ring — a 2 x 3" band of laminated spruce encircling the entire lay-up.

To begin fuselage construction, one of the longitudinal lay-ups was placed in the mold and given a thorough coating of glue, while the convex side of the center ply was being liberally slopped. The center part of the "sandwich" was then picked up by its transfer ring and laid in on top of the prepared longitudinal. While this center ply was getting a pasting on the inside, another longitudinal was sloshed with glue and then laid in on top of the center ply.

When all three gooey plies were nested in the mold, a concrete cover, with a rubber bag attached beneath, was lowered onto a projecting lip slightly below the inside edge of the mold, and tightly secured to I-beams and bolts built into the rim of the concrete mold. Air pressure amounting to 150 tons was then forced into the rubber bag, distributing 15-20 psi along the whole shell. This uniform pressure was applied for 24 hours. Then the completed shell was popped out by the transfer ring and placed on a drying rack to rid it of moisture.

When two shells had been completed, they were joined as left and right sides of a fuselage to the skeleton framework and held there by strap-type clamps until glued and nailed into place with barbed cement-coated brass nails.

Early model fuselages were painted directly on the wood, while later models were fabric-covered and doped for even greater strength and beauty. The addition of wheel pants, beefed-up landing gear, improvements and changes in the empennage and other control surfaces and in the windshield design, the installation of the NACA (National Advisory Committee on Aeronautics) cowl — all led to greater strength and durability while enhancing the speed and beauty of the aircraft.

The slogan, "It Takes a Lockheed to Beat a Lockheed," soon became aviation jargon. From the *Golden Eagle* roll-out to the last model of the Vega, the "boys" in the shop, the fellows in engineering and even the pilots themselves worked to keep up with or exceed the state of the art. With relatively slight changes in tooling, five models — all built to fill different requirements — were produced from the one basic Vega design. Yet, this optimum use of the functional design, along with continual aeronautical improvements and advancements, resulted in only minor alterations in the Vega's original configuration. Thus, it ultimately reached its fullest potential. Named for a major star, the Vega denoted speed, distance and reliability — an accurate forecast when good design and construction techniques were melded into one.

Her climb to fame began with the highly successful Arctic flight of Hubert Wilkins and Carl Ben Eielson across the uncharted expanse from Barrow, Alaska, to Green Harbor, Spitzbergen, in April 1928. Wilkins was so impressed with the performance of the aircraft that he ordered another for his Antarctic attempt later that same year.

These successful flights inspired him to name the Antarctic's Lockheed Mountains, Capes Keeler and Northrop, in honor of their contributions, and Whirlwind Glacier after the dependable Wright Whirlwind engines. The first new lands discovered from an aircraft were reached by Wilkins in a Lockheed Vega.

After that, scores of firsts resulted from the basic Vega design and subsequent configurations — the Air Express, Explorer, Sirius, Orion and Altair. New records were set and old ones toppled under the guiding hands of Wilkins and Eielson, Art Goebel, Amelia Earhart, Ruth Nichols, Wiley Post and Harold Gatty, Laura Ingalls, Herb Fahy, Jimmie Mattern. The list of fliers is legion — the Lindberghs, Paul Mantz, Jimmie Doolittle, Joe Crosson. . . . Historic accomplishments by legendary pilots resulted in one huge sentimental crush on a "good ol' girl."

One of her biggest suitors today is Dave Jameson. His weakness for the Vega in general, the Winnie Mae in particular, led him to wait for years for the chance to buy a durable ol' gal who'd been through a succession of 14 previous owners and worked like a Trojan all her 40 years.

Jameson had researched, gathered and studied all the available data on Vegas and Winnie Mae. Long before that aircraft finally was ensconced in his hangar, Jameson's infectious enthusiasm for his project had spread. When the actual restoration began, early-day construction techniques supplied by pioneer craftsmen were effectively mated to the latest in modern aircraft development provided by those still active in aviation.

Jameson's monumental effort at refurbishing and refinishing the Vega culminated at the August 1969 gathering of the Experimental Aircraft Association in Rockford, Illinois. The Grand Champion Award for Antique Aircraft was bestowed on the re-

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stored version of the Winnie Mae and her owner. Dave Jameson had effectively turned back the clock to a time when Winnie Mae and her pilot, Wiley Post, thrilled Americans of all ages.

Winnie Mae

Continued from page 21

(±1") is just about right. Put keepers on the Kwik-links, because once the assembly is enclosed, it's difficult to get to.

Decide which engine is to be used and select its mount. A radial mount to match the engine is best, whether it be a Tatone, HP, or solid oak rails and box. Install securely with No. 4 bolts and blind nuts through the ¼" firewall. To keep the weight up front, I used a side mount. Between F3 and F5 install two vertical 3/16" ply stiffeners.

Place the constructed wing on the fuselage skeleton so that W2 mates with F3 and W1 fits snugly behind F3. Check for squareness with stab and fuselage. Drill through both F3 and W1 with a ¼" drill and install the front wing plugs, using a rounded ¼" hardwood dowel. Epoxy them well into F3.

For the rear mount I used two Tatone wing holddowns but only one is required; this would make installing the wing much easier. Take two Tatone wing holddowns and open one of them up with a drill so that the ¼"-28 nylon bolt passes through with ease. Locate and install on W3 the one with the threads. Place the wing in the front wing plugs and locate the threadless holddown on F5 to match.

Now to plank! Switch to Ambroid and buy plenty of ⅛" balsa. Strip it to about ¾" wide pieces. Collect approximately 10,000 construction T pins. Have a drink. Get rid of the cat 'n' the kids, and go into isolation.

Be sure to plank on both sides, top and bottom simultaneously. This prevents any twists in the fuse. Rig a jig, if possible, but keep it straight! That fuse measures about 27" around and it'll take a while. Don't rush it. Ambroid is recommended because it sands easier than Titebond. A solid block can be used up around the firewall, if desired, but I planked it. The wing can now be set (but not bolted since there's no way to get to it) on the top of the fuselage.

Cowling: The cowling technique is a matter of preference. I built mine from fiberglass by turning a cylindrical wooden plug with a 1" radius on the front to the dimensions as shown. Then, with a glass cloth lay-up, I made a mold over this plug. Then cowling and replacements can be laid up as required. An aluminum pot the right shape could be used; or a cowling spun to fit. Be sure the cowl is cylindrical. When mounted, it remains round in the front and becomes elliptical in the rear.

Make four cowling mounts and epoxy them to the inside of the cowl so that the cowl is square with the fuselage. In addition to the epoxy, put a layer of glass cloth over each of the four mounts as added collision insurance.

Mount the cowling to the firewall using No. 4's and blind nuts. This is taken on and off several times, so get it on right and provide clear access to the mounting screw heads. Check for adequate and even propeller clearance around the cowl.

Landing Gear and Pants: Construct the two shock absorbers which tie into the fuse at F3 on the metal fittings. The upper part is formed with brass sheet and soldered at the trailing edge. The hardwood lower portion is shaped to the desired streamlined

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design and made to slide-fit into the brass portion. A hardwood plug is carved to fit the upper brass portion.

Four of Sig's No. 4 spade bolts are needed. Solder brass tubes onto two of the spade bolts to the length shown. Drill the hardwood lower portion to accept a suitable size coil compression spring. Drill the upper wooden plug to accept the spade bolt with the brass tube attached.

Epoxy this assembly into place using the hardwood strut as an alignment aid. After it's set, drop the coil spring into the hole in the hardwood, and try it out. About five pounds of force to compress the spring is correct. Drill and place the remaining spade bolts into the bottom of the hardwood. Both of the spade bolts are aligned so they'll fit the slots in the metal fittings top and bottom. Use No. 4 bolts to mount both top and bottom.

The pants are made in a conventional manner. I used 1/16" ply with a layer of glass cloth for additional strength for the outside plates and ¼" soft balsa for the core. Shape and sand as shown.

Prepare a brass fitting which attaches to the same small mild steel block that attaches the shock absorber strut. Install the 5" Williams Brothers wheels, avoiding toe-in. Grind down a 3/16" wheel collar to fit inside the pant to hold on the wheels.

Windshield: To cut the pattern shown, use .03 aluminum cut and bent to fit. Eventually, it's held in place by straight pins and can be removed. Make the final fit by checking it with the wing installed. Then mount the windshield to the fuselage.

The sliding top door is made from 1/32" ply. The "glass" is 1/32" butyrate contact cemented to the underside. Butyrate is also used on the soft aluminum for the windshield. Don't install the "glass" until after painting is finished.

Fairings and Lights: Four types of fairings are used: soft balsa, formed plastic, hardwood and paper, each in its place. For the fairings around the landing gear wire, use milled, simulated steel, wooden I-beams available to model railroaders. They have a 3/16" web, and two of these epoxied around the wire with the addition of 3/16" balsa on the front and back slots will streamline it to shape. Using ⅛" I-beams, make rear landing gear struts in the same manner.

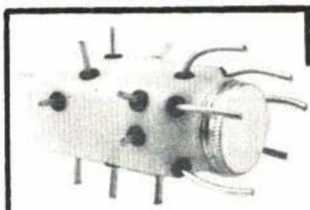
The wing and taillight covers, the small streamlined fairings on the side covering the shock absorber attach points and those on the wheel pants were preformed using 1/16" plexiglass heated and pulled over balsa forms. This gives the appearance of stamped metal. Trim by sanding. Paint these fairings separately and attach last.

Scale Details: A two-inch-to-the-foot Vega is a dream scale airplane to build. There were so many famous Vegas during the Golden Age of Aviation that the possibilities for scale ships are staggering.

Rivets, when they appear, are lightly sprinkled on the cowl, pants, tail cone fairings and struts. Lay out the rivet pattern (lightly penciled) making sure the lines are straight and the rivets evenly spaced. Then use a glue gun with Titebond to put on the rivets just prior to the final finish coat. This retains the well-defined heads.

For the instrument panel I used photos of the instruments on the Winnie Mae's panel. By blowing up negatives to scale size, cutouts from the print could be fitted neatly into I M Products' bezels that had been recessed in a thin brass sheet. Panel knobs, cranks, primers and other protrusions were made from soldered brass tube, thin sheet metal, rivets and other oddments. The assembly was spray-painted flat black before the cutout photos were contact cemented in.

After the first two coats of Hobbypoxy have been applied, cut out the door and windows. The door is cut out of the fuselage, hinges put on, and a latch installed. The window frames are made from stiff, hard-finished business cards glued around the openings. Clear butyrate windows can be installed with either one-minute epoxy or contact-cemented after the plane is painted.



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Color and Markings: After the normal amount of DAP filling, sanding and re-DAPing, paint the entire airframe Hobbypoxy white (H-10). The light blue on the cowl, pants and the words "Winnie Mae" are Hobbypoxy H-26 with 10% white added. To get good sharp edges, use vinyl tape for masking. To paint the dark blue on top of the wing and to do the dark striping on the fuselage, use Pactra Aero Gloss Corsair Blue. Putting the paints on in this sequence prevents masking pull-up.

The NR-105-W on top and bottom of the wing were done with a desperation technique — contact shelf-paper stencils! Lay the numbers out on the contact paper and cut them out with a new X-acto blade. Use the large sheet as a mask to spray the blue numbers on the bottom of the wing. Use the separate cutouts as masking when painting the large blue outline on the top of the wing.

Make another set of two contact paper stencils for WINNIE MAE on the side. Spray the words with light blue Hobbypoxy and then stripe trim with dark blue dope.

For all that eye-killing lettering on the side, I used Letraset press-on letters — Folio Bold for all lettering, 24 pt type for "THE" and "OF OKLAHOMA," 18 pt for Post's record achievements and 12 pt for the listing of stops on the two round-the-world trips. After the letters are on, give the entire airplane two light spray coats of satin Varathane spray. It puts an excellent protective coat over the letters and dope and it gives the desired flat eggshell finish.

Engine, Radio, Etc.: Since I used a side-mounted engine with the new Pylon Brand SS-10 tank mounted just opposite the cylinder, a special padded box was mounted to the top of the engine mount for the battery pack. (Get that weight forward and observe the CG limits.)

Fashion a glow plug "extension cord" by attaching a wheel collar to the glow plug with a wire attached to the setscrew. The ground wire is secured under one of the engine mounting bolts. Bring these two out to a two-pin plug which attaches to the fuse just under the cowling, but still accessible. Place the switch along side on a small bracket. Everything remains hidden.

Rudder and elevator servos fit between F2 and F3, and the throttle servo and receiver go into the space between F2 and the firewall, F1. The antenna runs forward through the firewall and coils inside the cowling until ready to fly. Then it's stretched out and fastened to the left horizontal stabilizer. All my radio gear switches, etc., were hidden, but there's plenty of room for the builder to suit himself.

Flying: Jim Sunday became my Eddie Belande, because I was too emotionally involved to test fly the model. We started with a 14-6 prop. After a few taxi trials he attempted an ease-the-throttle-forward type takeoff, only to have the ship nose over because of toe-in. Then, after my jacket fell into the running prop, we had to switch to one of Bill Cooksey's 18-4 props.

Finally Jim poured on the coal and held lots of right rudder to compensate for the "P" effect. The Winnie Mae rolled about 12 feet and then lifted off for a total run of 20 yards.

The 18-4 prop on the Supertigre had no problem lifting that 15-lb. beauty under the 82" Clark Y 18. Once airborne, she was straight and true and quite fast. Flying is scale and requires coordinated turns using rudder with ailerons.

With that thick 3" wing, the Winnie Mae is not in a class with stunt aircraft, but does have adequate speed to perform rolls (more barrel than aileron) and loops. It would probably spin (to scale, of course), but since it was the first flight, Jim didn't try it.

He made several low passes so that pictures could be taken before he made the

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approach. With throttle back the ship came straight down the pike with no tendency to wallow or search. The ship touched down on two wheels, bounced a quarter to half an inch and settled in. Just beautiful.

Keep that stick back to hold the tail down. And remember, she's a tail dragger, so on takeoff or landing, fly it!

Straight and Level

Continued from page 5

Confessions magazine) played tennis with the school champ (Jay) on a visit to the school. MacFadden won (but the kid could have beaten him for he afterwards played tournament tennis) and said, if you ever need a job, look me up. Presently, Jay was working for MacFadden who began *Universal Model Airplane News* after the Lindbergh flight. It sold 55,000 copies a month, but MacFadden expected millions of readers. He dumped the magazine. George Johnson, a MacFadden accountant, and later *MAN*'s owner until his untimely death on the way back from the Bikini shot, offered the old man $500 for the book. With acceptance, Johnson suggested Jay sell two pages of ads in advance to the Ideal Model Aeroplane Co., and from those proceeds, raised the purchase price. Jay became ad manager. Still later, Charlie Grant, the greatest pioneering model airplane editor of them all (that's because he bought our first plan in 1933!) breathed life into the property. It is not our place to tell the full Cleveland story. We will say that his dad, on the day Jay left Tennessee for New York, bought him a two-way Southern Railway ticket. As far as we know, Jay still has the return portion of that ticket. He was not the kind of a guy who would have appreciated a customary retirement wrist watch.

Boss on C/L

Continued from page 38

pend on the plane on which it is to be mounted. A biplane installation will be pretty much like the high-wing mounting except that the leadout guide may be mounted on the strut between the wings. As experience is gained by the modeler, the placing of the bellcrank, leadouts and the materials used can be varied to suit the plane under construction. . . .

A Little Philosophy from Viet Nam: Mike Campbell, a Seabee stationed in Viet Nam, writes about his getting started in CL flying over there. Enclosed with his letter were pictures of a B-25 in a most spectacular fiery crash. Mike has something to say about his flying abilities and offers a few words of encouragement to other modelers just getting started. "I started flying over here, and this is one of my best crashes. Thought you would like to pass my words along to other modelers so they wouldn't stop flying because of a few crashes. I've lost about $200 in planes and engines — and am still flying — but a little more carefully!"

Anti-Glare Panels: Scale modelers looking for a flat black paint for those anti-glare sections of aluminum engine cowls and metal coverings might try Rust-Oleum flat black. Application of the paint is best accomplished by first scratching or roughing up the surface to be painted with a very fine sandpaper. Coat the area with Rust-Oleum zinc chromate paint as a primer. Then the paint, with proper thinning, can be applied by brush or spray gun. Brushing is more than satisfactory on these small areas because the paint dries with few or no brush marks.

After application of the zinc chromate, at least 24 hours should be allowed for thorough drying. If the paint appears a little rough due to the scratched metal surface, 400 grit wet and dry paper can be used (rub very lightly) to smooth out the paint. Apply a second coat of zinc chromate if necessary. Two light coats of the flat black can now be applied and should be more than sufficient to finish the anti-glare sections. The paint stands up well to raw fuel and is not affected by the residues of burnt fuel. . . .

Stranded vs Solid Lines: Pull-test requirements for all CL events have been under review. Now that the study is done, a proposal is before all members of the CL Contest Board. Its object is to set safety standards, line sizes and pull-tests for each CL event on the basis of the needs of the individual events. The goal is implementation of the new requirements in 1971. Modelers, especially those that are competition-minded, should contact District CLCB members for the details. Comments on the proposal should be directed in writing to CLCB members. Act now — don't groan after it's all over.

Blum on C/L

Continued from page 39

late the centrifugal force (pounds) for the Navy Carrier model that, once used, will perhaps make the rules change more acceptable. . . .

Carrier Buffs Reference: Basic setup for the Navy Carrier model, plus info and hints on the event, appear in an article by Cal Smith in the July 1961 *AM*. However, this article is nine years old and much has happened since. The February 1967 *AM* carried articles on "On-And-Off-Pressure," by Bob Williams and "Retract Gear," by Norman Bracken. . . .

Commemorative Air Races: The 60th Anniversary of the London to Paris Air Race, as popularized in the motion picture, *Magnificent Men and Their Flying Machines*, is the theme of a model contest scheduled for September 27 at Buder Park in St. Louis County. Sponsored by the *St. Louis Globe Democrat* and the Greater St. Louis Modeling Association, the contest will offer UC, FF, and RC events. RC models of antique aircraft (pre-1911) will participate in the closed course race and pre-WW I (1918) scale or semi-scale in the remaining events.

Smith on C/L

Continued from page 39

a National CL Speed Society like the NFFS is needed. . . .

Need a Line Reel?: Try two aluminum pie pans bolted bottom to bottom. Run a strip of masking tape around the center to keep the lines out of the joint, add a couple of handles and reel away. . . .

Shutting Down Engines: Some fliers throw blades and then shut down engines by screwing the needle in. This usually burns an engine down or at the least does major damage. Try clamping the spinner into a piece of rubber hose such as heavy-duty heater hose. If caught without the hose, sneaker soles can be used by clamping the feet together. This beats sticking the plane into the ground. One guy sanded a spinner down to the prop nut doing this and the engine still didn't quit. . . .

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showing that speed increased as the airplane was flown higher. Not so! As the airplane goes higher, the wing loading increases because of the banked condition, and the airplane slows down. Watch the fast airplanes. The pilot lays it out about head high. . . .

How To Slow Down An Airplane: Carl Dodge feels the best way to slow down Speed models may be to handicap the really fast ones by tying parachutes to the tails for them to tow. Good thought, Carl. We could use Red for C, green for B. . . .

Remember the Topping?: Does anyone remember the old Topping One-Hundred metal models of the late Forties? This postwar creation was an engineering disaster. Of stamped aluminum with spot-welded wing and stab, it had press-in plastic wing tips that popped out when and if the thing flew. It came complete with a three-bladed plastic prop with about 20 inches of pitch. A spinner was molded with it. A little red button covered the prop nut which had a habit of coming out when the engine backfired. It hit the chest every time.

The worst part was the metal fuselage. If the ignition coil was mounted too close to the aluminum (and there was no other way) every time the prop was flipped a fat spark jumped to the metal — and Zap! With good hot batteries in the airplane and a metal handle, and luck enough to get it flying, the pilot was zapped until the engine quit. Those were the Good Old Days? . . .

Need News Dept: Have gotten some pictures and a couple of club papers so far this month. If you have something you think will be of interest to others, bring it to the Chicago Nats and look me up. You will be credited for your ideas and photos. Also suggestions for future issues are welcome. . . .

New Rules in Effect: Check these rules in the '70 Rule Book: 6.2; second paragraphs of 6.7, 6.8, 6.9, 6.16; 6.16.1-d, f, g, also CLCB Interpretation; 6.16.2-d.

Tenny on F/F

Continued from page 35

sions either a blimp hangar or a coliseum as the only suitable place to fly. However, it often pays to set one's sights a little lower!

For example, fliers in Great Britain just got started again after several years of no indoor activity at all. They fly in 15-ft. halls and airplane hangars with about 20 ft. clear vertical space. This type of site is poor training for a World Championship, but these beginners are perfecting their ground handling experience. This is important, since indoor models are more often damaged on the ground than in flight. Observation of models in low-ceiling flight also gives valuable training in cruise adjustment. Good cruise adjustment pays off in any site, and low ceilings permit detailed observation of all parts of the cruise.

Picture a 40 x 60′ site with 20-ft. ceiling, smooth walls and smooth ceiling with flush lights. One's first impression is "What a dinky little crackerbox!" This site, so unpromising in appearance, is where 20% of all current AMA Cat. I records were set! This impressive fact illustrates two truths about indoor flying. First, a site with frequent availability and good conditions is far more valuable than most sites with large flying space could ever be. Second, the flying technique must be matched to the characteristics of the site, if top times are to be made.

The site mentioned above is Willis School in Hampton, Virginia, where Hal Crane's World Record flight was made. This flight, like most of the existing Cat. I Indoor Stick and Cabin records, was set by ceiling scrubbing. The technique of ceiling scrubbing (or rafter banging, depending upon the type of ceiling) has been highly developed to

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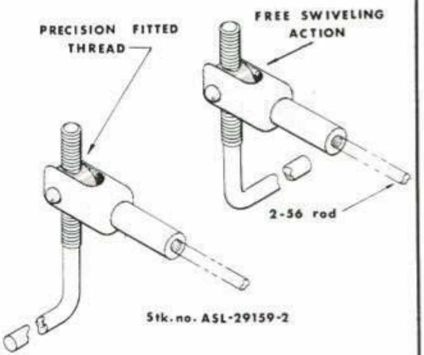

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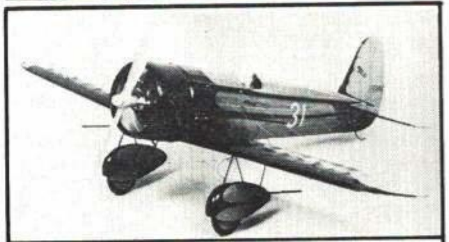

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enable the high times now listed in the AMA record columns.

The basic principle of this flying technique is that the model is allowed to contact the ceiling (or rafters) during about half of the flight. This is done by winding the motor so that the model has enough power to continue to climb after it reaches the ceiling. This makes it do one of two things, depending upon the type of ceiling. If there is a smooth ceiling, air spilling off the prop blades helps cause the model to nose down. It then flies just below the ceiling, touching prop tips and wing tips. In the case of a ceiling with rafters, the model touches a rafter, then drops its nose to regain lost flying speed. In either case, the model has to be specially adjusted for ceiling scrubbing. The rubber size is also critical, as are the number of turns used and how it is wound.

Even if you aren't trying to break 20 minutes in Cat. I, and especially if you are just learning to fly, the smaller site is not only adequate but far more desirable.

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Stalick on F/F

Continued from page 35

for a left turn in the glide—this is very important. I prefer to use wash-in (lowered trailing edge) on the wing that is on the inside of the turn, as it prevents spiral dives in strong lift. The model should make one turn in 15 sec. or less when in lift, and should stall slightly.

"It takes nerve, but at some time in the model's life crank the rudder over until the model almost spirals in, mark that position, and keep the rudder away from it thereafter! Move the tow hook forward until the model weaves when it is towed in a wind, move it back about 1/8 in., and epoxy it in place. Use the same position for wind or calm." It seems Peter hasn't heard about "tactical flying" in someone else's thermal—at the Nats he just ran and ran until he caught his own. (See Broadhurst, December 1969 AAM.)

Allnutt and Kenneth Kaczanowski have written a paper, based on tests of 21 Nordic gliders, on the effect of airfoil section and aspect ratio on still-air duration. It will appear along with many other fine articles in the report of the 1970 National Free Flight Society Symposium, or a copy can be obtained for $1 from Peter Allnutt, 22 Summerhill Gardens, Toronto 7, Ontario. Those who send him a self-addressed envelope will receive quarter-size plans of Adagio without charge. (This item and the drawing reported by Bob Meuser.)

Old-Timers Are New: Old-Timers contests have been around since the Stockton GMAC held its first annual contest eight or nine years ago. At that time, rules were established that are still in use. An Old-Timer is a design published, kitted or proved to have been built prior to December 31, 1942. Many modelers in their nostalgia for those "good old days" have joined in the movement for slower, more pressure-free model flying. For many, the image evoked in Herb Franck's sensitive film, *The Long Flight*, has inspired them to want to build Korda's Wakefield, Cahill's Clodhopper, or some other old-time rubber-powered model. Full-sized plans for these and many others are available from John Pond, "Mr. Old-Timer," 4135 Avati Dr., San Diego, Calif. 92117.

For those interested in building such a model from a kit, Midwest Models still kits a couple of them: Dynamoe, Jabberwock, and Gollywock by Wally Simmers. These small, high-powered stick models have their origins back in the prewar (WW II, that is) period.

These old-time models can be altered to some degree according to the standardized SAM (Society of Antique Models) rules governing competition. Generally, these modifications are aimed at beefing up the structure of the model to provide for fitting a dethermalizer....

Old-Timers Updated: Several suggestions for improvements to Old-Timer rubber models incorporate and take advantage of developments in the state of the art in the past two decades. The original old-timer rubber model didn't use high-energy Pirelli rubber. In fact, most of the rubber in use then was low in power output, although I understand that it was much less prone to breakage. Therefore, if the plan calls for 18 strands of 1/4-in. flat brown rubber, don't try it with a like amount of Pirelli. It could put that Korda into an elliptical orbit or twist the fuselage into a strange corkscrew shape. Instead, start at about half of what is called for and add strands as courage and faith in the model's trim grow.

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A final suggestion concerns glide trim. In the "good old days" modelers were not aware of stab tilt, that handy-dandy modern glide-turn device. By adding a bit of wash-in on that right wing main panel, another bit of right stab tilt, perhaps a wee amount of right rudder and some right thrust, that old-new-timer could be flying to new heights.

So, if you've been bitten by the Old-Timer Rubber Bug, and the vision of a nice steady wheels-off-the-runway ROG whets your modeling appetite, satisfy that hunger for little cost by building a Korda or some other Old-Timer. It's a great way to relieve those present-day tensions.

Meuser on F/F

Continued from page 34

His laminated props have up to 15 layers, and various woods can be specified. Write for a brochure to Woodcraft Model Products, Box 119, Big Rapids, Mich. 49307. . . .

Mamco Gearless Transmission: Remember the Mamco gearless transmission, used for connecting two or more rubber motors to a single prop? I do, and I also remember trying to make one that paralleled 15 motors. Of course, it was a failure because, at 13, I couldn't bend 15 pieces of wire exactly alike. At least six different models of the Mamco were produced in the mid-30's, among them one which was placed in the rear of the fuselage and had extension shafts driving a pair of wing-mounted props.

In principle it functions exactly like gears having a one-to-one ratio, but the Mamco is lighter and simpler. The two-motor model should be just the ticket for flying scale models, where small prop diameters and short fuselages limit the weight of rubber that can be packed into the model. If motor weight is less than half of the gross weight of the model, maximum flight duration is not obtained. Two motors in parallel produce 30% less torque and 40% more winds than the same two motors made into a single motor of the same length.

Alas, the Mamco went out when World War II came in. But here's how to make one.

Broadhurst on F/F

Continued from page 35

exhaust engines in FF events can't be considered by the FFCB for one year. That's an FFCB rule that applies to all defeated proposals. "However," says Joe, "I've submitted a proposal for an Open Class X to allow any type of reciprocating engine, no restrictions, all other AMA power rules applicable. Have figured this might be good for pipes and other experimental engines." . . .

Prop Warning: At the FF FAI Semifinals at Taft, California, last November, I was about six feet away when another flier's Torp 15 FAI Special threw a prop blade. No one was hurt, fortunately, but the incident caused me to get in touch with Bruce Paton, research and development manager for the L. M. Cox Manufacturing Co., Inc. The broken prop was the gray "Little Cox" 7D, 3.5P. Its center hole had been enlarged to fit the Torp. "The worst thing you can do," Bruce said, "is to tamper with the center hole on that prop. The 7D, 3.5P prop was made for our 09 engine. It can be used on the Supertigre 15, too, at speeds up around 25,000 rpm. But don't use it on any engine with a crankshaft diameter larger

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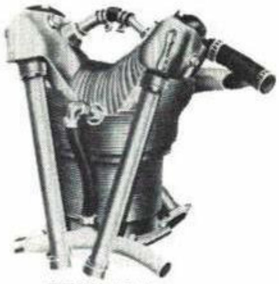

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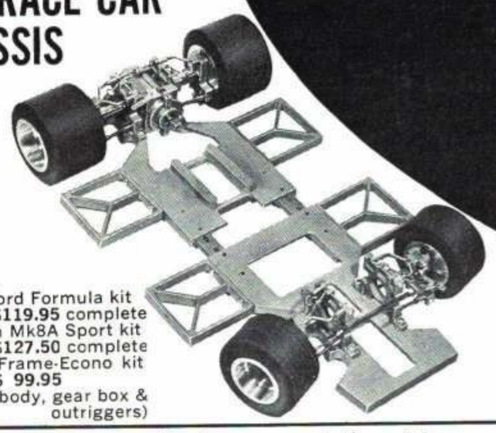

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than the hole we put in those props at the factory."

Paton added that it is very risky to modify any plastic prop, particularly those that are expected to turn at high speeds. All power fliers should make it a point to check their props closely after each flight for signs of cracks or dings that could spell trouble later. This goes for any prop — wood, plastic, fiberglass, or whatever.

SUPPORT AEROSPACE EDUCATION

Morse on R/C

Continued from page 36

informed unofficially. The official starter is in full control and only he can call an official cut. Some callers also count laps, unofficially, of course. Remember then, a good flier knows what's going on provided his caller is doing his job. . . .

Carburetor News: A new item being flown in many racers in the California area is an "in the air" needle valve adjusting carburetor for Torpedo or Supertigre racing mills. The carb was developed and is being produced by Bob Siegelkoff, of East Bay RC Club, and is being marketed by Elk Electronics of 148 Lynn Ave., Milpitas, Calif. 95122. Price is $19.95. Clearance has been obtained from NMPRA to fly the unit in sanctioned competition. Those who have experienced an engine lean-out in the sixth or seventh lap can appreciate the value of this little gem! Be sure to state engine details with the order. . . .

Wise Words: A parting thought for the month is this — reliability and consistency. You can't win without them! Don't experiment in a roll with hot-shot fuels, hopped-up engines or new flying techniques. Do these things at home during test flying sessions.

When participating in your first race, stay with a good steady engine that you know is right, don't exceed 40 or 50% nitro-fuel, check the plug after every heat, and, finally, don't milk every last rpm out of the engine on the starting line. Back off a notch or two and give the old mill a chance to percolate for ten laps.

Marks on R/C

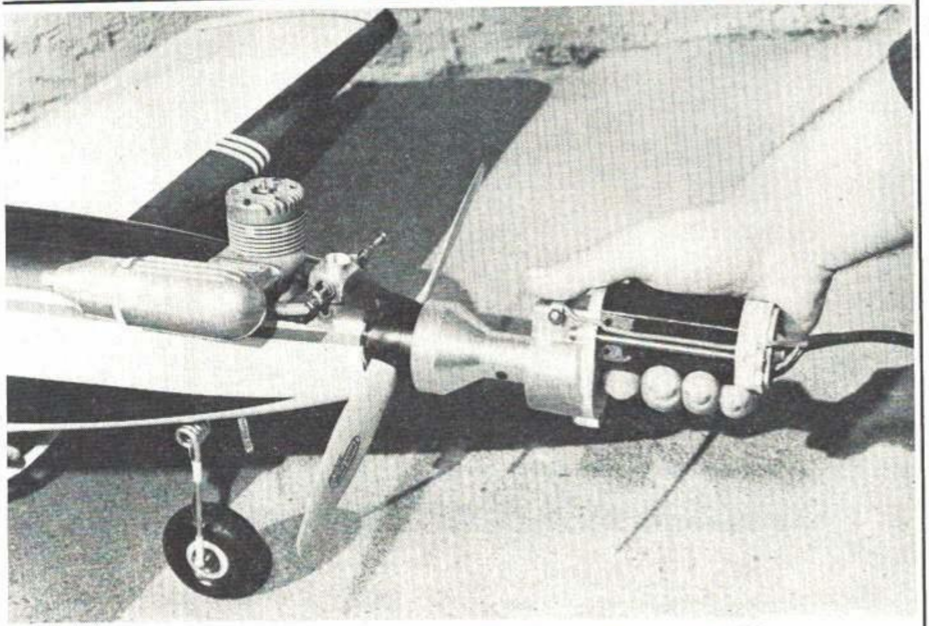
Continued from page 37

age should be eliminated. In addition, by using a PNP transistor and inverting the divider network formed by the transistor, R2, R3 and R4, the circuit should work satisfactorily with sets having a negative-going pulse.

Some analog servos have been built which have excellent resolution and plenty of power around neutral. Among them were the SPAR and the Orbit analog servos. By eliminating drift, some of these might even be usable for primary channels. Experimenters, let's hear your results! . . .

Slide Switch Mount: Most of us have used an internally-mounted switch arrangement at one time or another in an RC model. This pays dividends in keeping the switch clean but usually leads to a broken switch tang in the event of a crash. The clever arrangement by Jerry Smith and shown here was presented in the Tri-Valley R/C Club newsletter. Several suggestions may be added. If it is found undesirable to reduce the switch tang thickness to $\frac{3}{32}$ in. to accept the pushrod keeper, simply resort to the old keeper, a spring made of $\frac{1}{32}$ wire wrapped and soldered to the $\frac{1}{16}$-in. actuating wire will suffice. In addition, the $\frac{1}{16}$-in. actuating wire should be a relatively soft wire, rather than music wire, for easier bending and less damage in the event of that occasional crash. Jerry will probably note that the material he had indicated to secure the screws against vibration has been changed to Silastic. There's a reason. Some of the rubber-base cements used to secure wires, etc., contain sulphur. The vapors containing sulphur react with silvered switch contacts to form silver sulphide and poof! — instant corrosion. Silastic doesn't react. . . .

The Cost of Lost Parts: One of the common sights at the local flying field is the search for parts which have fallen from the plane, usually from the business end. One particularly troublesome spot is the



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carburetor attachment for O.S. engines. It is held in place by two Phillips-head screws which inevitably work loose. Even if one screw is lost, the engine won't run since a sizable air bleed is thus created. A simple solution to this problem is to take a bit of $1/32$ music wire and bend a C-shaped spring clip. Engage the ends in the screw slots; they can't back out now.

Another safeguard is a trick from full scale aircraft — safety wiring. Drill a small hole through the aft section of that prize muffler, both halves if it divides, and thread soft galvanized wire about $1/32$ diameter through the hole. Twist the wire and attach the other end to a screw into a motor bearer or the firewall. The same screw can be used to attach a flexible wire or nylon safety line from the coil of the nose gear to restrain the wire, wheel, and brake (often lost).

Siposs on R/C

Continued from page 36

lieve RC cars will be a big hobby.) or write to the manufacturer. Most cars can be purchased by mail order. New manufacturers enter the picture almost every month, some of them with big dollar signs in their eyes. Make sure to buy from a reputable outfit whose products have been tested and can withstand the rigors of hard-fought racing. Also keep in mind ease of repairs, so that they can be made with simple pliers and screwdriver, sometimes right in the pits. . . .

Racing notes: Dolan Lennan is organizing a racing club in the San Francisco Bay area. Contact him at 555 37th St., Oakland, Calif. 94609.

A race track is being built in Tampa, Florida. Allan F. Moody and his partner are constructing a huge track with ample facilities. A three-ft. high driver's platform, safety fencing and electric starters are being planned.

McEntee on R/C

Continued from page 37

rib edge to produce required dihedral. If multi-spars in wing are not parallel, it's better to use separate short lengths of attachment tubing which are parallel to each other. This makes it easier to get wing panels on and off. Harley feels this wing attachment method is lighter than any he has tried, has plenty of strength and enough give to prevent wing damage on poor landings.

He is the only glider flier in his area and would like company. Join him and enjoy a beautiful slope soaring site! . . .

Toledo Glider Category: One of nine categories at the 1970 Toledo R/C Conference was RC gliders. Top placer was Harold Van Horn, showing a huge Baby Bowlus. Cumulus Zeus by Dwight Hartman took second; Pell's Belle by Earl E. Pell was third. The pretty fair turnout should show Conference sponsors they were wise to establish a separate class. . . .

Foam Glider Wings: Several clubs are experimenting with foam wings, even for large-span gliders. Kits on the market also incorporate such wings. Glider wings are something of a trial to build, requiring a large number of ribs (compared to stunt and sport power planes), a true building surface at least five or six ft. long, and wing spars and sheeting spliced from stock three-ft. lengths. Some aspiring glider builders simply give up.

A Texas model glider enthusiast now offers foam wings with all necessary wood parts, including foam stab, for several of the more popular gliders. Among them are Snipe, Kurwi, Phoebus, Clou, and possibly others. Wing and stab kit for Kurwi ($29.95 — postage extra) is built to fit its metal fuselage tongues. For the 115" Kurwi wing, each precovered foam panel comes in two halves which are epoxied together. Full-length

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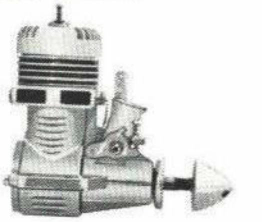

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spars are furnished. Wingtips are fiberglass. Panels may be flown as is after assembly, or can be finished to suit the builder. Wings for other gliders, as well as unusual airfoil shapes, may be ordered from Gerald Martin, Elite Model Mfg., 103 Avenue E, Hereford, Tex. 79045.

Gerald hopes to break the RC glider distance record with a Kurwi Universal 68 fitted with his foam wings. He had AMA sanction and a good many practice flights back in April, so a record flight may have been made by now. . . .

RC Glider Nats Event: This event will be held July 27-28, with assistance and approval of AMA. Briefly, rules are: max. glider weight, 11 lb.; max. wing loading, 3.95 oz./sq. ft.; max. wing area, 16.146 sq. ft. (both figures include total projected areas of wing, stabilizer and elevators). Class A is for gliders with 750 sq. in. or less (figured as above); Class B for those over that size. Entry fee is $3.00 per event; contestants may enter both classes. Max. winch line or stretched Hi-Start length is 984.3' (300 meters). Maximum flight time will be 15 min., with points deducted for excess. Points added for landing inside 15' dia. circle, 100; inside a 30' dia. circle, 50. For additional information, entry blanks, and a full set of rules, send stamped self-addressed envelope to *1970 Soaring Newsletter*, Box 49D, Plainfield, Ill. 60544. . . .

Eastern Glider Meet Schedule: While West Coast glider competition is well-established, Northeast activities are just getting set up. East Coast R/C Soaring Society will sponsor four meets: May 10, Delaware R/CC; June 6-7, DC/RC; Aug. 22, Lakehurst N.A.S., Lakehurst, N. J.; Sept. 27, Dover, Del. Entry fee at each meet will be $5.00. It is expected that winches and Hi-Starts will be provided. For full rules or other info on any of these meets, write Dick Sarpolus, 32 Alameda Court, Shrewsbury, N. J. 07701.

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McCullough on R/C

Continued from page 37

terest to scale fans are his laminated vintage WW I types up to 20-in. diameter, designed for both static judging and flying. Variety of woods, balanced, hand-rubbed, waxed and packed in a felt bag. $1.50 to $3.75, depending on size and style. . . .

Plans Plan: Robin Lehman will soon offer a line of full-size construction drawings for an assortment of interesting scale craft. Among them are multi-engine jobs, Twin Otter, Twin Porter, Britten-Norman Islander, also singles such as Druine Turbulent, Fournier. Well-done blue-line prints have patterns, full flying details. Twins have all flown successfully on one engine. . . .

On The Air: An airbrush is an invaluable tool for the scale builder. But investigate before buying. Many of the outfits sold at hobby and graphics supply stores are intended for fine artist's work and are suitable only for small projects, plastic kits and superfine "aging" effects on large models. The same companies make air brushes of large capacity, generally listed as for sign painters and for heavy colors or lacquers. Get the largest size, the Paasche H-5 is one, with detachable 3-oz. bottles. The bottles and lids are inexpensive, a half dozen are required for most efficient results, thus enabling painting a multicolored scheme without stopping for clean-up.

One bottle should be filled with thinner and a blast put through the brush after stopping painting and again before resuming to open up the tool. If light colors are used first and not allowed to dry up, this flushing procedure will suffice. After a long period of dark color work it is best to take the brush apart and clean in thinner. Tiny deposits of old paint can build up inside and work loose later, invariably spattering a prominent part of a model. Some brushes have a tendency to spit a small blob just as the trigger is pressed, so start the spray in mid-air and then move onto the area to be painted.

Use blush-retarding thinner even if the humidity is low. An "orange peel" surface will result from regular fast drying thinner or too thick a mixture. About 50-50 is the ratio for experimentation, aluminum or gold will take less. Mix in an old fruit jar and strain through silk to take out any lumps. Don't waste money on aerosol propellant cans or a cheap compressor. A good small air compressor, preferably with a tank and regulated pressure up to 40 lbs., will pay for itself quickly.

While just right for trim and details, even the biggest air brush proved to be a bit of a drag on large surfaces. Then the Paasche Mural Gun with a half pint cup was discovered. This looks like a miniature edition of the usual house painter's sprayer but is much more useful and precisely made. The design is particularly well-adapted to dope and doesn't clog. Even sanding sealer and filler coat goes through with facility and produces such a smooth result little sanding is necessary. An adjustable head sets the spray pattern from $^1/_{32}$- to 6-in. wide without so much of the technicolor fog associated with a full size gun. . . .

Dopey: Modelers get so used to the smell of the hobby they become thoughtless. A trip to the hospital instead of the Nationals brought home to the writer the dangers of breathing spray fumes and soaking hands with thinner. The ingredients involved are potent, damaging. Adequate ventilation with fans, an inhaler mask and plastic gloves are a must. . . .

Scale Data Sources: The Library of Congress (Washington, D. C. 20540) has a collection of Air Force Technical Orders and its Photoduplication Service can supply copies on microfilm. Most useful for modelers are the Pilot's Handbooks which generally contain complete drawing and photo coverage of the cockpit and the Erection and Maintenance Manuals with many details. Inspection, Parts and Structural Repair books are of limited value. The negatives may be hand fed through a 35 mm projector or read on a microfilm viewer at almost any library—many are equipped to reproduce enlarged photocopies. Normal photo enlarging techniques work nicely in event exact size reproduction of instrument panel layout drawings, etc., are required.

Lowe on R/C

Continued from page 36

performance. This can be a heck of a lot of fun, assuming that the aircraft is one which the average Sunday flier can safely handle.

The following criteria could be used for such an event: (1) airplane flight characteristics easy enough for the average flier to control; (2) a simple, inexpensive airplane, preferably a two-control setup with engine shut-off capability by rolling inverted; (3) a modestly fast airplane to provide the excitement of racing but not difficult to handle in a competitive situation; (4) preferably identical airplanes or a set of simple dimensional requirements; and (5) an engine power limit requirement, preferably a 19 stock engine.

To get into the nitty-gritty of limiting power or controlling engine variations, I would suggest an absolute limit on inlet venturi area. Venturi area has a powerful influence on engine power as those who have experimented with this will attest. This venturi area restriction would be a good criteria for any racing event. It's certainly as powerful as displacement in determining engine power output....

An Unusual Annual Contest: The Indian City R/C Club (Wyandotte, Mich.) indicates plans for something beyond the usual for their 17th Annual Contest, Aug. 15 and 16. Besides classes A, B, and D and scale events, they will host the Association of Michigan R/C Clubs Great Lakes Club Team Championships. This is the second year for the team championships, operated on the basis of points accumulated by members of association clubs. For example, a club enters members in pattern classes A and B. The team score will be the average of the members' scores as compared to perfection in their individual classes. The two best flights count. For example: Member No. 1, Class A scores 126 points in his two best flights. Averaged over a perfect score of 240, he earns 52.5%. Member No. 2, Class B, scores 216 out of 320 points and averages 67.5%. The total team average is the sum of Members 1 and 2's percentages, divided by two for a final result of 67.5%.

The basic objective is to encourage club support of novice fliers. This sounds tremendous and is worthy of attention by other clubs. Mufflers are mandatory for this contest....

Versatile Staple Gun: Joe Chalapowski has discovered that the staple gun found in most hardware stores is a most useful tool. He uses it for stapling canopies onto his models. He then covers the canopy outline with tape which hides the staples. He also uses the gun for attaching plywood wingspan center braces to hold while the glue is drying and to add extra strength. He also says it can be used to pin plastic hinges into place. It would seem a little thought could dream up even more uses. I've noted that Lanier uses staples on various structural assemblies in its plastic airplane designs.

Convert Can Clutter To Fuel Tanks: Phil Gabler has stepped up with an idea to turn discarded aluminum beer and soft drink cans and other zip top beverage cans into efficient and useful fuel tanks. An adapter is needed to fit and seal the hole in the end of the can and to support the vent and feed tubes. This is made by using the sketch dimensions and the following instructions.

Take one of the two identical parts and tap the two end holes or drill to fit self-tapping screws. Drill the two center holes to snug-fit 3/16" fuel line. Make a brass tube vent line in the usual shape. Drill or ream the other identical adapter part so that the two end holes allow clearance for the fastening bolts or self-tapping screws. Make the two center holes the same as in the other adapter part.

Make a sheet gasket out of fuel-proof rubber and cement to the tapped plate. Slip the feed line through one center hole and a ½" length of line through the other. Insert the gasketed plate on the inside of the tank (can), place the other plate on outside and fasten with bolts or screws. Slip bent tube through the ½" length of tubing and a 1½" length of ⅛" brass tubing into the pickup line and through the hole in the adapter. From now on fuel tanks can be the least costly item.

Kraft Series Seventy

Continued from page 53

smooth, positive, and precise. The auxiliary channel levers are located below the switch and sticks near the center of the case (see photos, just above the Kraft logo). The unique switch guard provided prevents inadvertent switch turnoff if the flier fumbles for trim and also guards the switch from being turned on by being bumped.

A new feature is the use of a non-slipping antenna connector molded of nylon. The older ASP fitting has been dropped—a great step for eliminating the unscrewed

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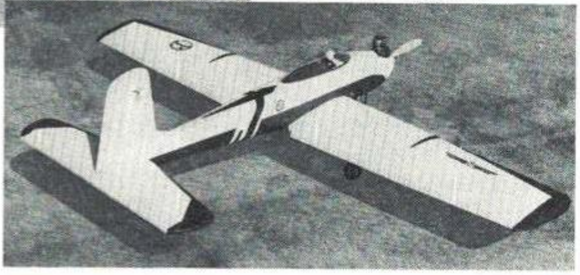

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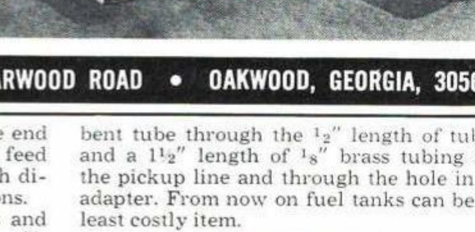

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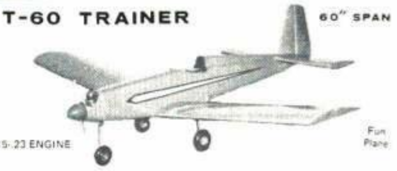

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connector problem on old sets. (For those who wish, I'd recommend that one of the new fittings be purchased to replace the older connector.) A 54-in. base-loaded antenna is used.

Competition has brought about the era of the buddy-box system and at no increase in cost. At least four manufacturers now provide this system as standard equipment. The Kraft system tested includes this feature. It works as follows. Any transmitter may be the master or slave (trainer or instructor). Only the master transmits RF; i.e., the RF section of the slave transmitter is shut off. The encoder of both transmitters is live, and the RF section of the master transmitter will be modulated by whichever is selected by the instructor pilot, at his will. The instructor exercises this prerogative by control of a momentary-on push button on the slave transmitter face. As soon as the trainee experiences difficulty, the instructor simply lets off the "enable" button and takes control. The test set has a switch for selection of master or slave operation; however, a somewhat simpler approach is being developed. The switch will be deleted and master/slave operation automatically determined by choice of the direction in which the connecting buddy cable is connected. The buddy box arrangement is a boon to the many new modelers.

Electronically, the transmitter uses well-proven logic circuitry. A free-running multivibrator sets the repetition rate at approximately 30 frames per second. This is followed by six half-shot multivibrators. The gate line of seven pulses drives a squaring amplifier which squares, amplifies, and shapes the pulses to nominal 350 microsecond wide pulses. The shaping of these pulses is quite important since modulation sidebands are affected by the rise and fall time.

The RF section (72.40 MHz) consists of the crystal-controlled oscillator at 36.20 MHz (doubled to give 72.40), the modulator, and a single-output RF amplifier transistor. The final amplifier drew 40 milliamperes at 10.5V for a nominal 420 milliwatts into the final. There are four stages of tuning via trimmer capacitors in the RF section: one for the oscillator, one interstage and two for antenna coupling. Never touch these unless you have the requisite skill and FCC Second Class operator's license.

Layout of the transmitter is neat and simple except for the buddy box arrangement carried on a separate set of wiring and a mother board. All cabling is sufficiently long for servicing of the transmitter without removing the stick assemblies, and all cabling is tied at intervals with lacing cord.

The receiver is essentially the same electronically as preceding Kraft systems. A double-tuned front end is followed by three stages of IF. AGC feeds back from the detector to preceding stages. The detected pulse train is amplified and squared by a Schmitt trigger to nominal 280 microsecond pulse widths for use in driving the decoder. The decoder stage in an SCS type uses discrete components. The output pulse is positive going and approximately 1.5 milliseconds duration plus and minus 0.5 milliseconds for control.

The major changes to the receiver are in its packaging and in the plugging arrangement. An integral plug block is inset to the decoder and accepts the power plug and the six servo plugs. A new plug is used which is considerably smaller and uses crimped connections to gold-plated pins. The face of the plug block is flush with the end of the receiver case, and a spring plastic clip is molded to the receiver case to retain the plugs in place. A similar connector is used in the switch harness but has no retainer. This particular plug should be taped to prevent inadvertent deplugging — quite acceptable in that a separate plug is provided for mounting to the side of the model for battery charging. Thus, unplugging the power cable is seldom necessary. However, don't forget to turn off the receiver before charging.

Physically, the decoder and receiver boards are mounted face to face in slots in the molded nylon case and the cover is taped in place. The arrangement permits a package size of 1⅛ x 1 1/16 x 2 3/16" with no protrusions. This makes for a convenient and snug fit into a length of foam sleeving (Nelson Model Products — Receiver Sleever). One nicety which should be added to the molded case is identification of the various outputs, i.e., A for aileron, E for elevator, etc.

As indicated earlier, three servo types are available for the system. The older KPS-9 servo is available as a special order item only. The KPS-10, which has been standard in the past, is 1 21/32" high to the top of the output disk, 13/16" wide, and 2 5/32" long, including the mounting lugs. It is a comparatively slow servo, having an end to end (100 degrees) transit time of nominally 0.9 sec. Maximum output thrust available is an average 2½ lbs. (slightly more thrust is available in one direction than in the other).

The new design KPS-12 is a smaller servo; 1 9/16" high, including the output disk; ¾" wide; and 1 23/32" long, including the mounting lugs. This servo uses a larger size grommet for mounting than is used on the KPS-10. Rail mounting is noticeably easier because flanges are wider.

The servo case is held together by a clever pinning arrangement restrained by wrapping several times with a very high strength tape. This quite secure arrangement eliminates the usual assembly screws. Initial tests showed the KPS-12 to be considerably faster than the KPS-10, nominally 0.6 sec. for end-to-end 100 degrees transit. The KPS-12, being faster, is slightly less damped and moves in discrete steps. However, this is not noticeable even in an extremely sensi-

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tive airplane — the Slik-Fli. The assumption that increased speed had been achieved at the expense of output thrust was disproved when it was found that the KPS-12 has greater thrust, 2¾ lbs. in both directions. Since no gains can be made without expenditures, further investigation ensued.

The KPS-12 does indeed use a higher-drain motor, having a smaller diameter which permits the smaller case. Current drain is increased as follows: KPS-12 running unloaded draws 75 ma, the KPS-10 draws 50 ma; running under load, the KPS-12 draws 350 ma, the KPS-10 draws 250 ma; stalled, the KPS-12 draws 400 ma, the KPS-10 draws 350 ma. Based on bench testing we found that a full system (assuming at least four servos) may be operated on the 250 mah packs for only one hour of total operation under load. This should not present any problems as long as the modeler is aware of the limit. However, the standard pack provided with the system is made up of 500 mah cells which provide a full day of flying time.

The KPS-11 is ⅞" wide; 2½" long, including the mounting lugs; and 1⅝" high, including output arms. Measured thrust was 2¾ lbs., measured at the inner position to compare directly with the KPS-10 and 12. This servo has all the features of the older KPS-9 but comes in a case about one-third smaller.

Choice of servos is up to the individual. The dual-output KPS-11 will provide the greatest flexibility in a larger package. The KPS-12 provides greater speed and thrust at the expense of slightly higher current drain. The KPS-10 provides the middle of the road. While the flexibility of dual output is appreciated, the preference is for smaller servos, even in a large model. They have lower mass and tend to stay in place more easily in the event of an overly hard landing.

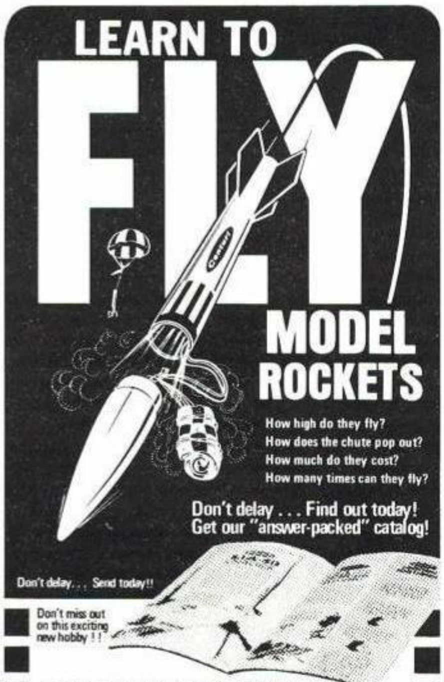
Bench tests consisted of the preceding servo tests and of the following procedures. The usual rigorous environmental test was performed at 0 degrees F and at 150 degrees F. One KPS-10 servo slowed down considerably in one direction at 0 degrees F. At room temperature, it also was found to have slightly lower thrust in that direction than others. No discernible differences in performance were detectable between room temperature and 150 degrees F. Range checks were quite satisfactory. For purposes of reference, the range with the transmitter antenna removed was found to be nominally 25 ft., comparable with an air range of well beyond the range of vision.

Flight-testing was performed in a Triton as kitted by Dumas Models, Tucson, Arizona. A two-year-old design by Jim Kirkland, it still is completely up-to-date. The kit is a composite of construction materials: molded foam wing with balsa covering, fiberglass fuselage nose from the wing forward, and all-balsa for the rest of the fuselage and tail surfaces. The Kraft radio, using a combination of KPS 10 and 12 servos, easily fit in the plane. A complete line of servo trays is now available from Kraft, but only trays for the 10's were obtainable at the time of testing. So the 10's went into the fuselage and a 12 was put into the aileron installation. An old but potent S.T. 60 provided ample power.

The Triton, when tested with the Kraft radio, was quite heavy since it had recently flown through a tough tall tree because of a pushrod failure. Repairs were not difficult because the model has an extremely strong structure and fiberglass nose, but complete repainting and finishing were necessary. The Triton is fast, stable, and looks like a jet in flight. Too bad the wheels are not retractable. One could carve enormous loops out of a big chunk of sky with precision. Rolls were fast and true. Our Triton was a bit heavy for really good extended knife-edge flight. It is stable in landing approach but touches down fairly fast. Sink rate is easily controlled with throttle.

Overall performance of the tested system was excellent. The set is well-designed and easy to service. Kraft is well-known and has a good service system. One point needs clarification: the charging system uses a 5-watt, 100-ohm dropping resistor and a diode to provide approximately 45 milliamperes charging current to the receiver and transmitter packs in series. This exact same arrangement is used on almost every other manufacturer's system. Recent warnings of danger from high voltage with this arrangement, therefore, are equally applicable to all systems not using an isolation transformer. When charging *always* (1) connect the receiver pack to the transmitter, (2) plug the wall cord into the transmitter, then (3) connect the wall cord to the wall socket. When in bare feet or damp shoes, never handle any 110V electrical equipment on a basement floor.

A few criticisms should be noted. The stick knobs do not provide the best grip for oily fingers, particularly if the flier grasps the knobs with thumb and forefinger rather than "thumbing" them. In the battery pack, identical to that used by a number of manufacturers, individual cells are connected by spot-welded straps. These straps sometimes break or the welds fail. All manufacturers should back up these straps with a protective arrangement such as flexible braided wires, etc. In addition, more widespread use of high quality cells is most desirable. Finally, a positive means of restraining the power and aileron cable plugs should be provided — for example, a plastic clip.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AMA Contest Calendar

Continued from page 64

FF, CL & RC Model Airplane Championships. Site: Marshall Airport. T. Southern CD, 303 Eden Dr., Apt. 35, Longview, Tex. 75601. Sponsor: **Northeast Texas Model Airplane Club.**

July 19 — Moundsville, W. V. (AA) Moundsville Valley I.F.O.'s RC Fun Fly. Site: Allied Chem. Co. Rec. Field. S. Strum CD, Box 5234, Vienna, W. V. 26101. Sponsor: **Valley I.F.O.'s MAC.**

July 19 — Brighton, Wisc. (A) Illinois Model Aero Club-N.I.A.M.A.C. FF Contest. Site: Bong Field. P. Sotich CD, 3851 W. 62nd Pl., Chicago, Ill. 60629. Sponsor: **Illinois Model Aero Club.**

July 19 — Vandalia, Mo. RC Demonstration-Fly-In. Site: Vandalia Airport. R. Williams CD, 4060 Bondurante Dr., Bridgeton, Mo. 63044. Sponsor: **Spirits of St. Louis RC Club, Inc.**

July 19 — Jamestown, N. Y. (AA) United Pylon Racing Circuit RC Meet. Site: Winch Rd., Lakewood, N. Y. H. deBolt CD, 3833 Harlem Rd., Buffalo, N. Y. 14215.

July 19 — Rockford, Ill. (AA) Rockford Annual CL Contest. Site: Riverdahl Park. A. Johnson CD, 1818 Oslo Dr., Rockford, Ill. 61108. Sponsor: **Rockford Aeromodelers.**

July 19 — W. Suffield, Conn. (A) Nor-East Air RC Races. Site: Peterson Farms. B. Williams CD, 347 Southwick Rd., Westfield, Mass. 01085. Sponsor: **Northern Conn. Radio Control Club.**

July 25-26 — Sunnyvale, Calif. Kosby Memorial Contest (Fun-Fly). Site: Pioneer Field. J. Sunday CD, 363 El Camino, Mt. View, Calif. 94040. Sponsor: **Pioneer Radio Control Club.**

July 25-26 — Minneapolis, Minn. (AA) 1st Annual CL Minneapolis All Speed Cash Bash. Site: Pending. L. Stockstad CD, 2648 Carlson Dr., Coon Rapids, Minn. 55433.

July 26 — Eugene, Ore. (AA) Eugene Model CL Aeromeet. Site: Mahlon Sweet Airport. R. VanDell CD, 869 Armstrong, Eugene, Ore. 97402. Sponsor: **Eugene Prop Spinners.**

July 26 — Fresno, Calif. (A) Fresno's Monthly FF Contest. Site: Near Kerman, Calif. F. Gallo CD, 1725 Kenmore Dr., W., Fresno, Calif. 93703. Sponsor: **Fresno Gas Model Club.**

July 27-28 — Glenview, Ill. (AA) Nats Week RC Glider Event. Site: To be announced. D. Burt CD, 3048 Central St., Evanston, Ill. 60201.

July 27-Aug. 2 — Glenview Naval Air Station, Ill. (AAAA) National Model Airplane Championships. Traditional Events. For Nats entry blanks send a

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Aug. 2 — Mentor, Oh. MARCS ¼ Midget RC Pylon Race. Site: Club Field. F. Vidmar CD, 26500 Zeman Ave., Euclid, Oh. 44132.

Aug. 2 — Levant, N. Y. First Annual Fly for Fun. Site: Blanchard Road. W. Johnson CD, 62 Widrig Ave., Jamestown, N. Y. 14701. Sponsor: **Flying Rebels of Jamestown, N. Y.**

Aug. 6 — Oshkosh, Wisc. 1970 EAA Delta Dart Program. Site: Whittman Field. J. Grega CD, 355 Grand Blvd., Bedford, Oh. 44146.

Aug. 8-9 — Flossmoor, Ill. (AA) 3rd Annual SAC RC Meet. Site: Flossmoor Rd. & Central Ave. S. Peterson CD, 6416 So. LaPorte, Chicago, Ill. 60638. Sponsor: **Suburban Aero Club of Chicago.**

Aug. 8-9 — Saginaw, Mich. (AA) Saginaw Valley Annual RC Meet. Site: SVRCC Flying Field-2240 Lone Rd. G. Gill CD, 2020 Lone Rd., Freeland, Mich. 48623. Sponsor: **Saginaw Valley RC Club, Inc.**

Aug. 8-9 — Colorado Springs, Colo. (AA) Pikes Peak RC Pattern Meet. Site: Pikes Peak RC Club Field. B. Hayhurst CD, 1219 Oswego, Colorado Springs, Colo. 80904. Sponsor: **Pikes Peak RC Club.**

Aug. 9 — Ohio City, Oh. (A) RC Club Contest. Site: Club Field. D. Kraner CD, RR No. 1, Ohio City, Oh. 45874. Sponsor: **SHOO Flyers MAC, Inc.**

Aug. 9 — Baton Rouge, La. (AA) Bayou State CL Model Airplane Championships. Site: L.S.U. Grounds. G. Cleveland CD, 540 Gebelin St., Baton Rouge, La. 70802.

Aug. 9 — Portville, N. Y. (AA) Southern Tier RC Pylon Meet. Site: Olean Model Airplane Club Field. B. Brown CD, 1255 High St., Bradford, Pa. 16701. Sponsor: **Olean Model Airplane Club.**

Aug. 9 — Hastings, Minn. (AA) MMAC Silent CL Meet. Site: Webers Airstrip. L. Stockstad CD, 2648 Carlson Dr., Coon Rapids, Minn. 55433. Sponsor: **Minneapolis Model Aero Club.**

Aug. 9 — Lancaster, Oh. (AA) F.O.R.K.S. Annual RC Bash. Site: F.O.R.K.S. Field. J. Slater CD, 809 Forest Rose Ave., Lancaster, Oh. 43130. Sponsor: **Fairfield Ohio Radio Kontrol Society, Inc.**

Aug. 9 — Denver, Colo. (A) Monthly FF Old Timers Meet. Site: East Colfax Airpark. W. Baldridge CD, 1464 So. Lafayette St., Denver, Colo. 80210. Sponsor: **Model Museum Flying Club.**

Aug. 15-16 — Jacksonville, Fla. (AA) RC Club of Jacksonville Annual RC Meet. Site: Imeson Airport. H. Pierce, Jr. CD, 208 W. Forsyth St., Jacksonville, Fla. 32202. Sponsor: **Jacksonville RC Club.**

Aug. 15-16 — Wyandotte, Mich. (AA) Indian City RC Meet. Site: Penn. & Allen Rds. E. Lynn CD, 3167 22nd St., Wyandotte, Mich. 48192. Sponsor: **Indian City RC Club, Inc.**

Aug. 15-16 — Tacoma, Wash. (AA) Mt. Rainier Summer RC Championship Contest. Site: Mt. Rainier RC Soc. Field. B. Gale CD, 811 9th Ave., S.W., Puyallup, Wash. 98371. Sponsor: **Mt. Rainier RC Society.**

Aug. 15-16 — Converse, Ind. (AA) 3rd Annual Converse RC Flying Club Meet. Site: Converse Airport. W. Hutchins CD, 201 E. Main St., Portland, Ind. 47371. Sponsor: **Converse RC Flying Club.**

Aug. 15-16 — San Diego, Calif. (AAA) Southern Calif. CL Regionals. Site: Robb Field. R. Perry CD, 4659 Bermuda Ave., San Diego, Calif. 92107. Sponsor: **Mission Bay Prop Twisters.**

Aug. 15-16 — Endicott, N. Y. (AA) 15th Annual RC Contest. Site: Tri-Cities Airport. R. Noll CD, 96 Pine Knoll Rd., Endicott, N. Y. 13760. Sponsor: **Aeroguidance Society, Inc.**

Aug. 15-16 — Wichita, Kans. (AAA) 3rd Annual Wichihawks Fall FF & CL Rally. Site: Wichita Modelers Council Field. J. Finley CD, 5217 Murdock, Wichita, Kans. 67208. Sponsor: **Wichihawks MAC.**

Aug. 15-16 — Minneapolis, Minn. (AA) 14th Annual T.C.R.C. RC Meet. Site: T.C.R.C. Field. J. Duncan CD, 3835 Tonkawood Rd., Minnetonka, Minn. 55343. Sponsor: **Twin City RC Club.**

Aug. 16 — Green Bay, Wisc. Summer RC Fun Fly. Site: Austin Straubel Field. R. Cowles CD, 2424 Duharme Ln., Green Bay, Wisc. Sponsor: **Green Bay R.U.F. Club.**

Aug. 16 — Alliance, Oh. Alliance Carnation City RC Fly for Fun Meet. Site: Barber Airport. G. Villard CD, 3301 23rd St., N.W., Canton, Oh. 44708. Sponsor: **Alliance Balsa Bees RC Club.**

Aug. 16 — Westminster, Md. (AA) Westminster CL Meet. Site: Westminster Shopping Center. R. Pease

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Aug. 16 — Fredonia, N. Y. LSAM Fly for Fun RC Meet. Site: LSAM Field, Lake Rd. A. Hemenger CD, 1031 Central Ave., Dunkirk, N. Y. 14048.

Aug. 16 — Pike, N. Y. (AA) Western N. Y. FF Assn. Meet. Site: Junction of Rts. 39 & 19. E. Evans CD, Box 87 N. Main, Richburg, N. Y. 14774.

Aug. 16 — St. Louis, Mo. (AAA) Mid-western CL Mid-western Model Airplane Championships. Site: Buder Park Model Flying Field. A. Schaefer CD, 4206 Virginia Ave., St. Louis, Mo. 63111. Sponsor: **St. Louis Yellow Jackets, Inc.**

Aug. 22-23 — Lakehurst, N. J. 2nd Annual RC Soaring Contest. Site: Lakehurst Naval Air Station. D. Sarpolus CD, 32 Alameda Ct., Shrewsbury, N. J. 07701. Sponsor: **Monmouth Model Airplane Club, Inc.**

Aug. 22-23 — Great Falls, Mont. Big Sky RC Modelers Annual RC Fun Fly. Site: BSRCM Field. T. Walker CD, 16 Aspen, Great Falls, Mont. 59401. Sponsor: **Big Sky Radio Control Modelers.**

Aug. 22-23 — Omaha, Neb. (AA) Omahawks 16th Annual RC Contest. Site: Omahawks Flying Site. R. Hess CD, 11720 Cedar, Omaha, Neb. 68144.

Aug. 22-23 — Orange, Mass. (AA) 17th Annual N.E. RC Championships. Site: Municipal Airport. C. Olson, Jr. CD, P. O. Box 51, Auburn, Mass. 05101. Sponsor: **New England Radio Control Modelers, Inc.**

Aug. 22-23 — Fargo, N.D. (AA) 14th Annual Red River Valley CL Championships. Site: F. M. Skylarks Flying Field. M. Olson CD, 305 27th Ave., N., Fargo, N.D. 58102. Sponsor: **F. M. Skylarks.**

Aug. 22-23 — Cloverdale, Ill. (AA) 8th Annual AMA RC Contest. Site: Club Flying Field. H. M. Mosquera CD, 361 N. Arrowhead Trail, Carol Stream, Ill. 60187. Sponsor: **West Suburban RCr's, Inc.**

Aug. 23 — Mansfield, Oh. (AA) Electronic Flyers RC Meet. Site: Mt. Zion Rd. M. Kalish CD, 235 Cline Ave., Mansfield, Oh. 44907. Sponsor: **Electronic Flyers.**

Aug. 23 — Haymarket, Va. (AA) Second Annual FF Contest. Site: Snow Hill Farm. J. Clawson CD, 1846 Lusby Pl., Falls Church, Va. 22043. Sponsor: **Fairfax Model Associates.**

Aug. 23 — Davenport, Ia. (AA) Davenport CL Model Airplane Meet. Site: Davenport Municipal Airport. J. Kroeger CD, 1218 So. Zenith Ave., Davenport, Ia. 52802. Sponsor: **Davenport Model Airplane Club.**

Aug. 23 — Midland, Tex. (AA) Annual Midland Chapparals CL Meet. Site: Sidwell Park. L. Hood CD, 4410 E. 37th, Odessa, Tex. 79760. Sponsor: **Flying Chapparals.**

Aug. 23 — Muncie, Ind. (AA) Mid-States CL Plane Championships. Site: West Side Park. J. McDonald CD, Box 284, Daleville, Ind. 47334.

Aug. 23 — Johnsville, Penn. (AAA) Eastern States FF, CL & RC Championships. Site: Johnsville Naval Air Facility. R. Leishman CD, 167 Goldenridge Dr., Levittown, Penn. 19057.

Aug. 23 — Denver, Colo. Air Frolics, RC Eyeball Scale Aerobatics. Site: Jefco Field. D. Johnson CD, 12604 W. Virginia Ave., Denver, Colo. 80228. Sponsor: **Jefco RC Club.**

Aug. 29-30 — Tulsa, Okla. (AAA) Tulsa Glue Dobbers 21st Annual FF, CL & RC Model Airplane Championships. Site: 145 E. & 41 Sts., S. W. Kehr CD, 4940 N. Johnstown, Tulsa, Okla. 74126. Sponsor: **Tulsa Glue Dobbers.**

Aug. 29-30 — St. Charles, Mo. (AA) Thirteenth Annual McDonnell RC Meet. Site: Conductron Plant. W. Feldmeier CD, 2955 Clearview Dr., Normandy, Mo. 63121. Sponsor: **McDonnell RC Club.**

Aug. 29-30 — Billings, Mont. (AA) Billings Flying Mustangs RC Meet. Site: Mustang Field. A. Darnielle CD, 3043 Bartonia Blvd., Billings, Mont. 59102. Sponsor: **Billings Flying Mustangs.**

Aug. 30 — East Meadow, L.I., N.Y. (AA) L.I.M.A.C. Annual FF & RC Contest. Site: Mitchel Field. R. Lampione CD, 32-15-35 St., Astoria, N. Y. 11106.

Aug. 29-30 — So. El Monte, Calif. (AA) West Coast RC Championships. Site: Whittier Narrows. J. Garabidian CD, 909 N. 3rd St., Montebello, Calif. 90640. Sponsor: **San Gabriel Valley RC.**

Aug. 29-30 — Fentress, Va. (AA) Tidewater RC V Annual AA Meet. Site: Fentress Aux. Air Field. B. Miller, Jr. CD, 5390 Cape Henry Ave., Norfolk, Va. 23513. Sponsor: **Tidewater RG.**

Aug. 30 — Fresno, Calif. (A) Fresno's Monthly FF Contest. Site: Near Kerman, Calif. F. Gallo CD, 1725 Kenmore Dr., W., Fresno, Calif. 93703. Sponsor: **Fresno Gas Model Club.**

Aug. 30 — Rockford, Ill. (A-Entry Restricted). Rockford Fox Valley CL Meet. Site: Riverdahl Park. A. Johnson CD, 1818 Oslo Dr., Rockford, Ill. 61108. Sponsor: **Rockford Aeromodelers.**

Aug. 30 — Chardon, Oh. (AA) CRC 8th Annual RC Pattern Contest. Site: Club Field. F. Vidmar CD, 26500 Zeman Ave., Euclid, Oh. 44132.

Aug. 30 — Bloomington, Ill. (AA) 1st Annual Plug Burners CL Meet. Site: Bloomington Municipal Airport. J. Dew CD, 1304 Vernon Dr., Normal, Ill. 61761. Sponsor: **Plug Burners.**

Aug. 30 — Detroit, Mich. (AA) 1st Annual RC Pylon Racing Championships. Site: 18 Mile & Mound Rd. H. Mottin CD, 2124 Common Rd., Warren, Mich. 48092. Sponsor: **Radio Control Club of Detroit.**

Aug. 30 — Rochester, N. Y. (AA) United Pylon Racing Circuit RC Meet. Site: Monroe County Model Airport. H. DeBolt CD, 3833 Harlem Rd., Buffalo, N. Y. 14215. Sponsor: **Radio Control Club of Rochester.**

Aug. 30 — Vineland, N. J. (AA) ½A Day at the Races CL Meet. Site: Vineland High School. P. Haley CD, Braddock Ave., RFD No. 5, Hammonton, N. J. 08037. Sponsor: **South Jersey Aeromodelers.**

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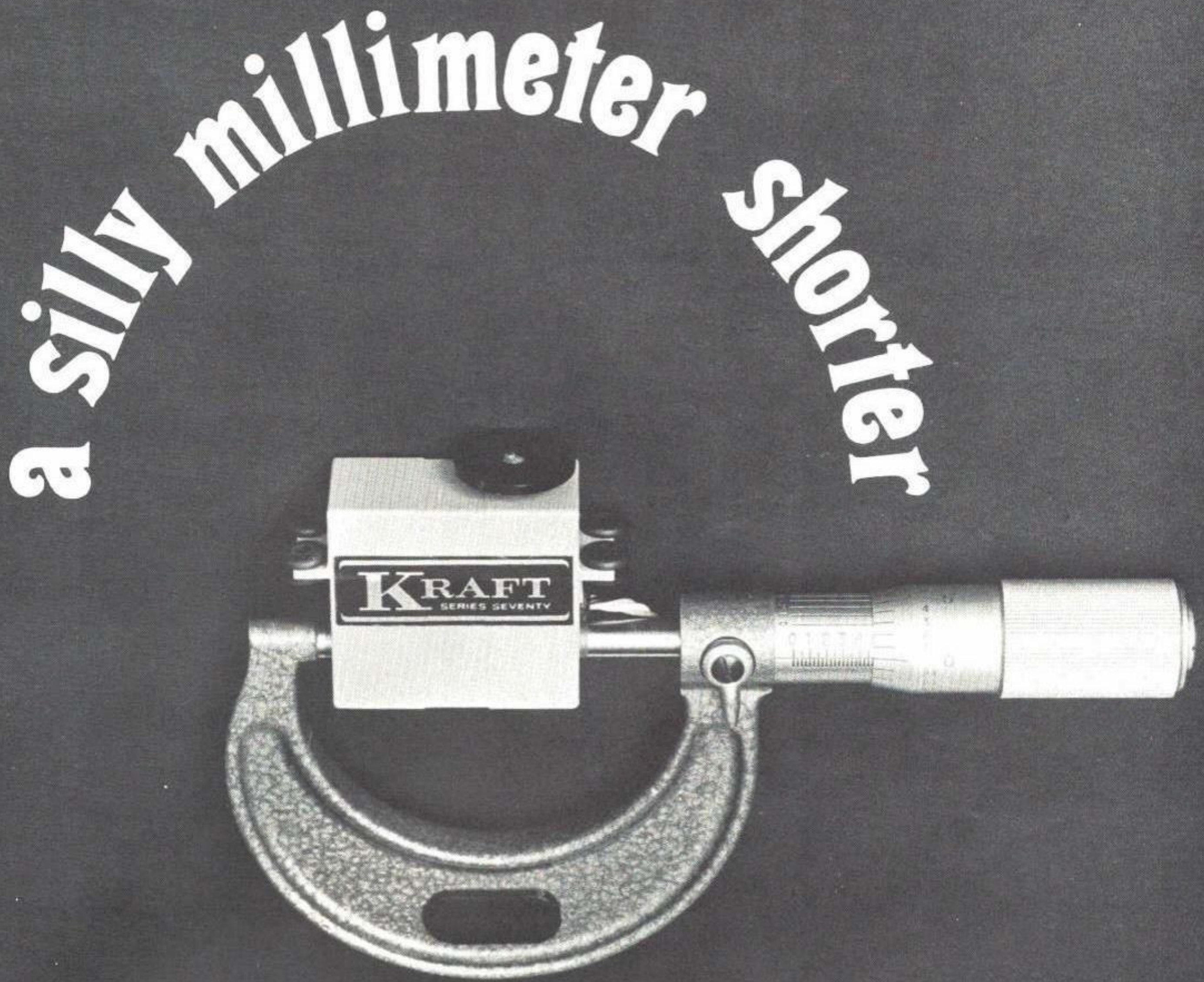

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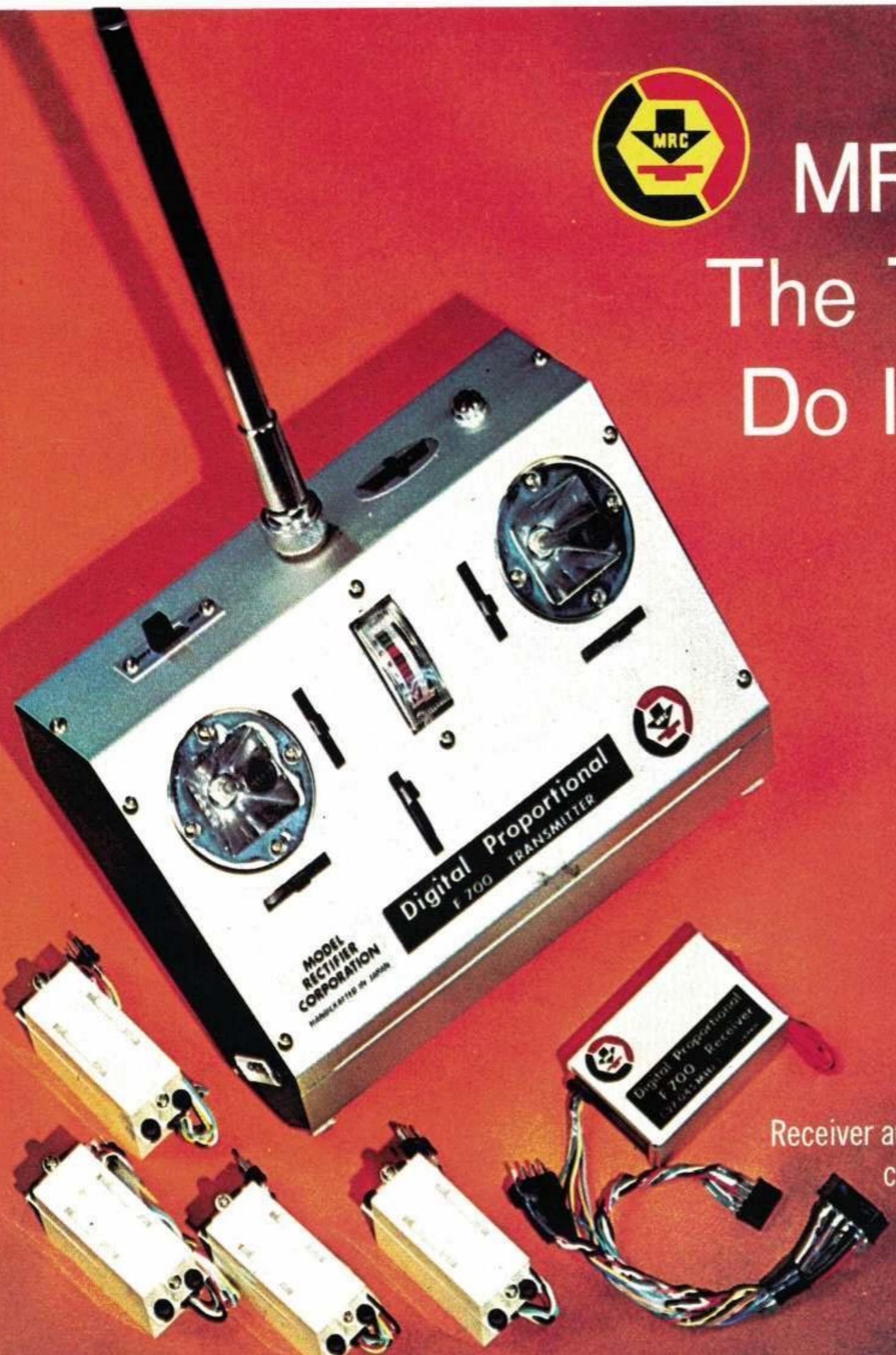

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